THE

# Journal

OF THE

## AMERICAN OSTEOPATHIC ASSOCIATION

*Volume Fifty-Two*

**SURGICAL NUMBER**

Number 7 | 212 East Ohio St., Chicago 11, Ill. | March, 1953

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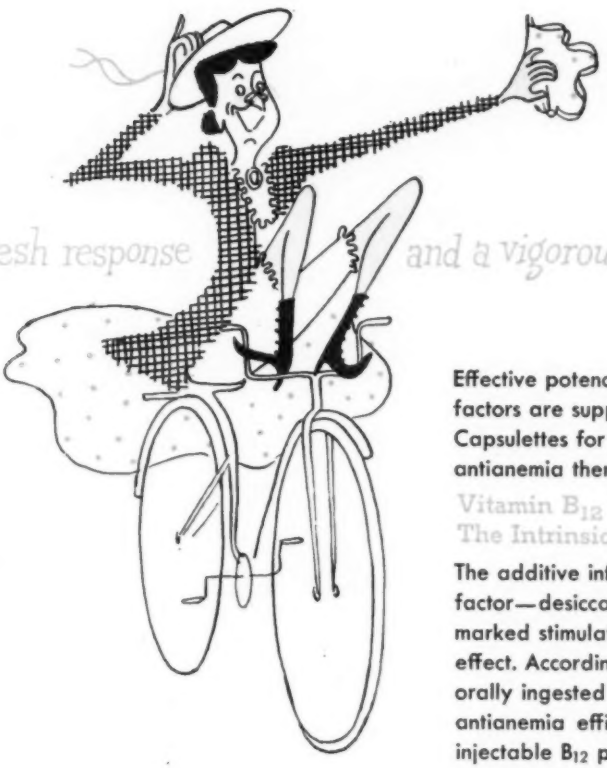
*1. Cantor, A. J., Am. J. Proctol. 3:204-210, (Sept.) 1952.*



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Published monthly by the American Osteopathic Association. Office of Publication, 100 S. Kenilworth Ave., Oak Park, Ill. Address all communications to the Main Office at 212 E. Ohio St., Chicago 11, Ill. Subscriptions $10 a year. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized August 31, 1922. Entered at the Oak Park, Ill., post office as second class matter, April 1, 1926, under the Act of March 3, 1879.

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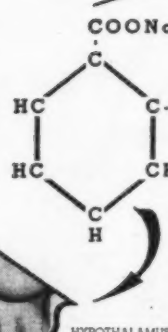


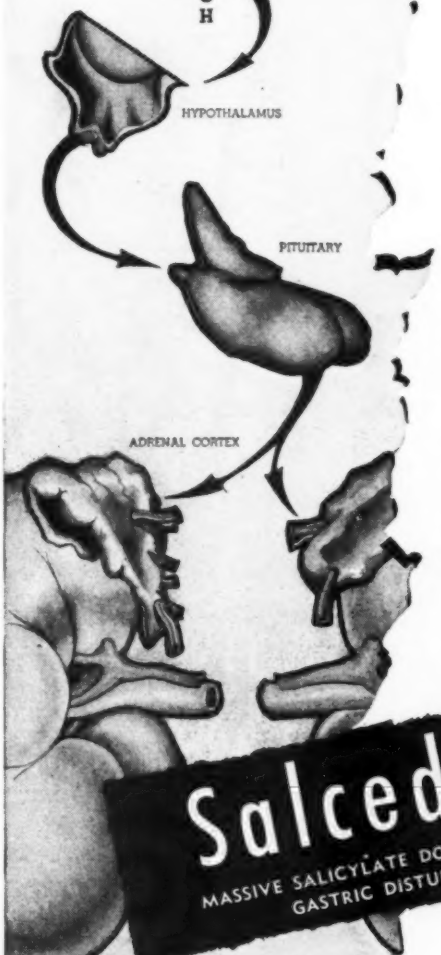


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*Proceedings Soc. Exp. Bio. Med., 1952, v80, 51-55, G. Cronheim, et al.

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1. The Physiological Basis of Medical Practice. 1945, p. 486.
2. New England J. Med. 235:80, July 18, 1946.

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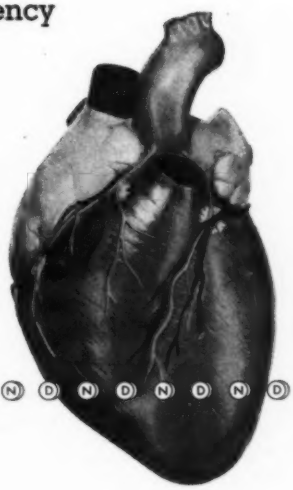

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# Only the WHOLE Fruit

## CAN GIVE YOU ALL ITS NUTRITIONAL BENEFITS...

As shown by the comparative tables below, only the whole orange can provide all of the valuable nutritional benefits of the fruit.

While orange juice is a popular and pleasant way to provide the daily quota of vitamin C, the fact is that the whole fruit is considerably richer in vitamin C and other nutrients as well as in the protopectins. These substances, the protopectins, are found principally in the albedo, the membranes enclosing the juice sacs and segments, and the fibrovascular bundles.

Only when oranges are eaten whole can *all* their benefits be realized, especially the desirable effects of the protopectins which, through their colloidal, chemical, and antibacterial properties, help to maintain a desirable intestinal environment, promote better absorption of vitamins and minerals, and effect more normal evacuation.

**Approximate Typical Analyses of Edible Portion and Strained Juice of California Oranges. Amounts shown are per 100 Gm. of fresh weight.**

| Constituents | Fresh Fruit, peeled | Strained Juice | Constituents | Fresh Fruit, peeled | Strained Juice |
|---|---|---|---|---|---|
| Calories | 46 | 46 | Inositol | 400.0 mg. | 200.0 mg. |
| Protein (including free amino acids*)[1,4] | 1.0 Gm. | 0.9 Gm. | Biotin | 0.004 mg. | 0.002 mg. |
| Fat | 0.3 Gm. | 0.2 Gm. | Folic acid | 0.004 mg. | 0.002 mg. |
| Dextrose and Levulose | 4.0 Gm. | 4.6 Gm. | Ascorbic acid (vitamin C) | 60.0 mg. | 57.0 mg. |
| Sucrose | 4.0 Gm. | 4.6 Gm. | Flavonoids (vitamin "P")[3] | 1.0 Gm. | 0.1 Gm. |
| Protopectins and Pectin | 1.0 Gm.[2] | 0.1 Gm. | Minerals (total ash) | 0.5 Gm. | 0.4 Gm. |
| Citric acid | 1.0 Gm. | 1.0 Gm. | Calcium | 50.0 mg. | 11.6 mg. |
| Malic acid | 0.1 Gm. | 0.1 Gm. | Phosphorus | 30.0 mg. | 20.0 mg. |
| Carotenes (pro-vitamin A) | 1.0 mg. | 0.16 mg. | Iron | 1.0 mg. | 0.25 mg. |
| Thiamine (vitamin $B_1$) | 0.2 mg. | 0.086 mg. | Sodium | 9.0 mg. | 6.0 mg. |
| Riboflavin | 0.1 mg. | 0.032 mg. | Potassium | 150.0 mg. | 170.0 mg. |
| Niacin | 0.5 mg. | 0.24 mg. | Magnesium | 10.0 mg. | 13.0 mg. |
| Pantothenic acid | 0.5 mg. | 0.21 mg. | Sulfur | 10.0 mg. | 8.0 mg. |
| Pyridoxine | 0.2 mg. | 0.08 mg. | Chlorine | 6.0 mg. | 6.0 mg. |
| | | | Alkalinity of ash, expressed as $K_2CO_3$ | 0.3 Gm. | 0.3 Gm. |

* Free amino acids include alanine, arginine, asparagine, cysteine, serine, proline, and glutamic, aspartic and gamma-aminobutyric acids. Glutathione is also present.

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All others from figures taken from the literature and data compiled by Research Department, Sunkist Growers. From known tissue distribution figures, appropriate adjustments have been made to reflect the composition of the entire edible portion in those cases where the original data referred to screened juice.

California navel oranges, available all winter, are the world's finest eating oranges — no seeds, rich in flavor and vitamins. Easy to peel, slice and section.

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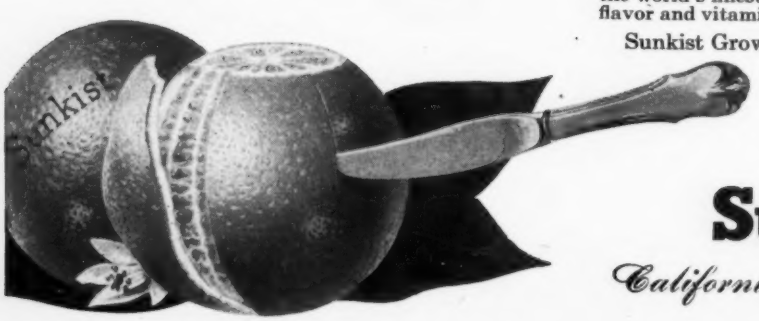


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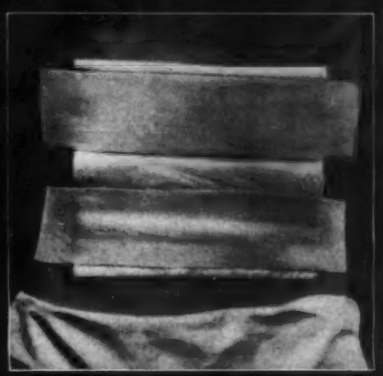

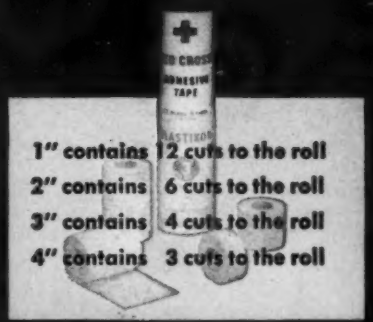


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ointment · solution (plain)

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"CHLORESIUM...an active agent in restoring affected tissues to a state conducive to normal repair..."[4]

"...effective agents in facilitating growth of granulation tissue and epithelization."[5]

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Literature containing comprehensive information on the uses of chlorophyll in medicine will be forwarded on request. Reprints of recent papers are also available.

CHLORESIUM OINTMENT and SOLUTION (Plain) contain water-soluble derivatives of chlorophyll "a" as standardized in N.N.R. These derivatives, highly concentrated and purified, provide the optimum therapeutic benefits obtainable from chlorophyll.

CHLORESIUM OINTMENT—1-ounce and 4-ounce tubes.

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| **FOLIC ACID** | 5.1 mg. |
| **GASTRIC SUBSTANCE** | 600 mg. |
| **FERROUS GLUCONATE** | 18 gr. |
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| **VITAMIN C** | 300 mg. |

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*"Evaluation of Hydrophilic Properties of Bulk Laxatives, Including the New Agent, Sodium Carboxymethylcellulose," Blythe, Rudolph H., Gulesich, John J., and Tuthill, Harlan L., Scientific Edition, Journal of American Pharmaceutical Association, February, 1949.

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| COBALT | 0.006 mg. | CHOLINE | 200 mg. |
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| *PHOSPHORUS | 940 mg. | *VITAMIN A | 3200 I.U. |
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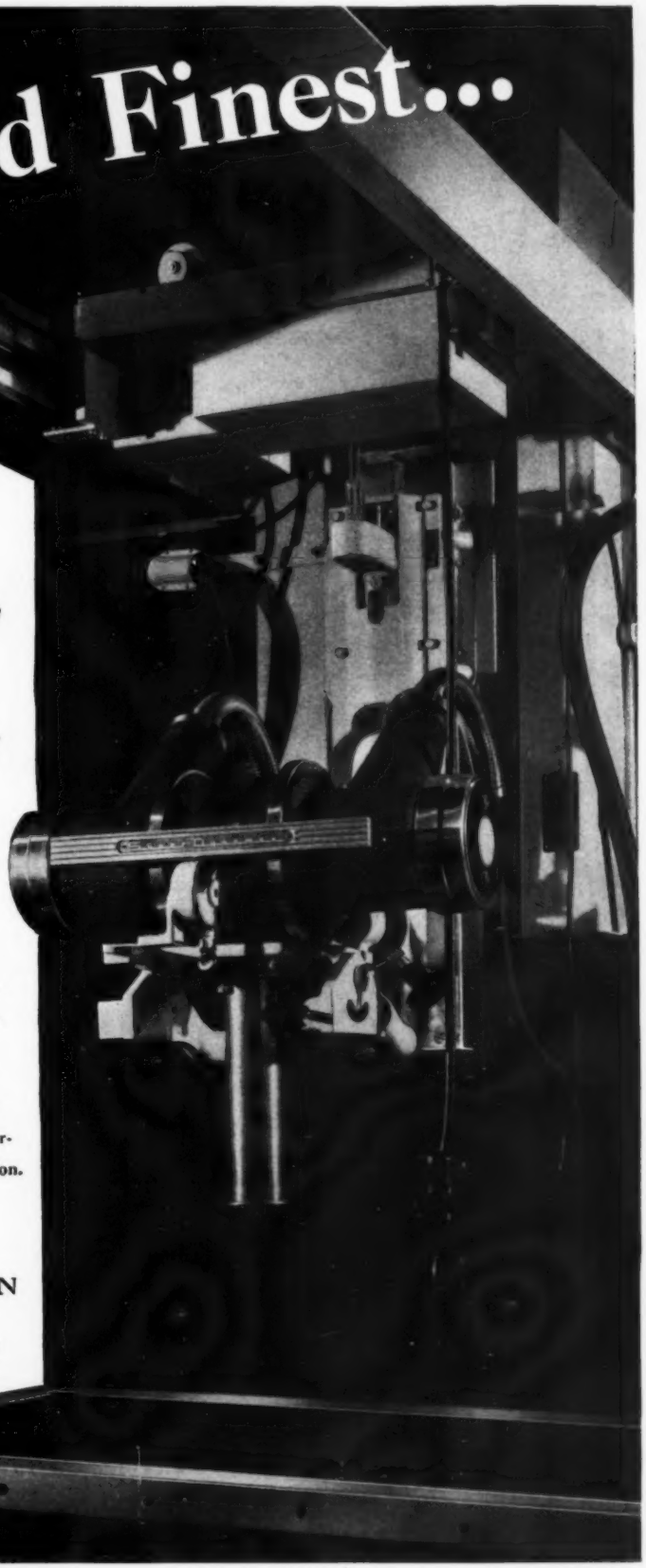

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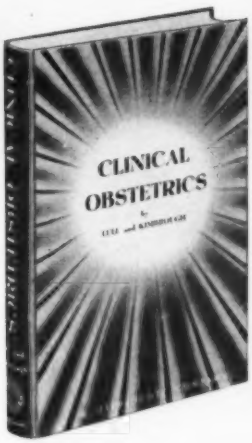
# Clinical Obstetrics




*By members of the staff of the Pennsylvania Hospital. Edited by Clifford B. Lull, M.D., Late Director, Division of Obstetrics and Gynecology, Pennsylvania Hospital; and Robert A. Kimbrough, M.D., Director of the Division of Obstetrics and Gynecology, Pennsylvania Hospital.*

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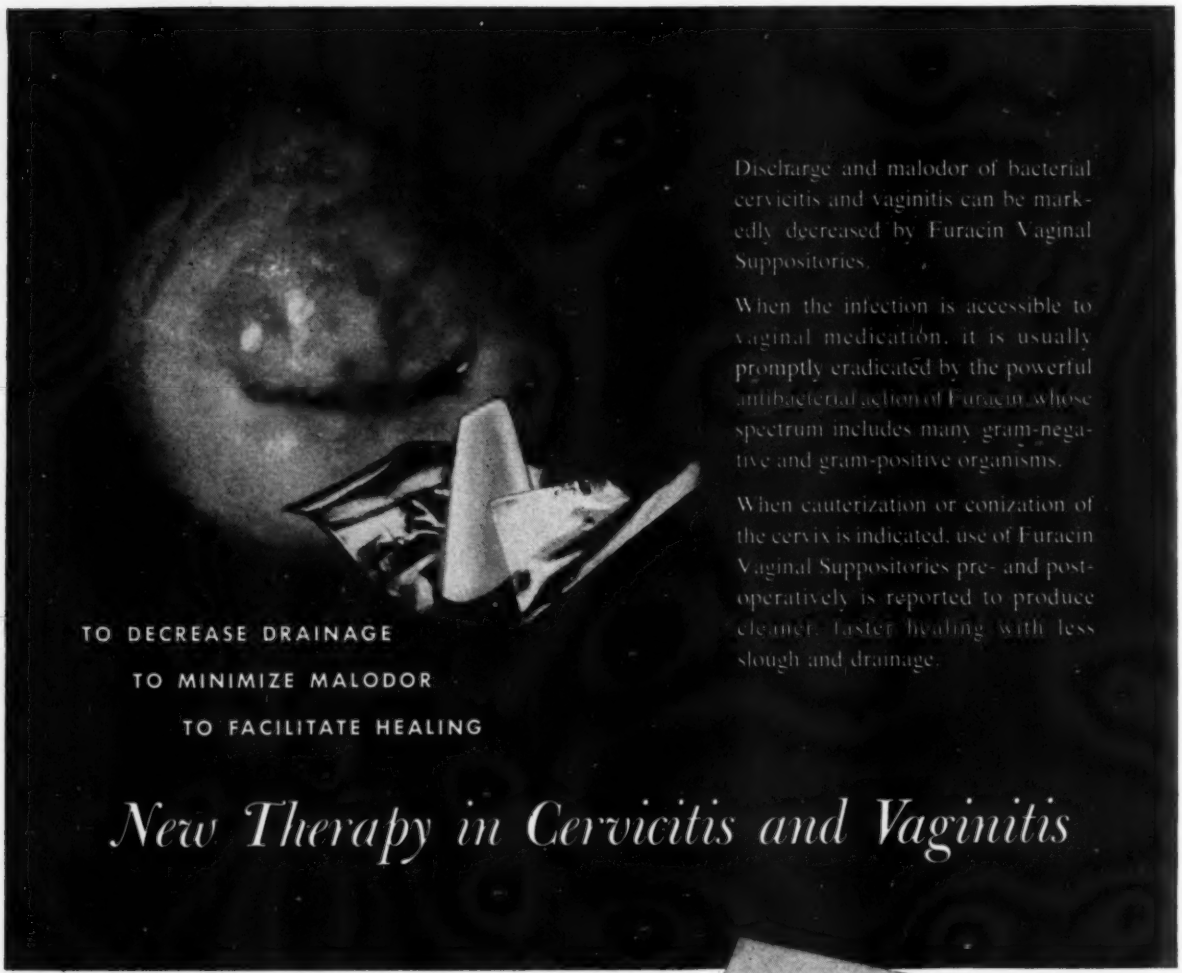


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**contain Furacin 0.2%, brand of nitrofurazone N. N. R. in a water-dispersible base which is self-emulsifying in vaginal fluids and which clings tenaciously to the mucosa. Each suppository is hermetically sealed in foil which is leakproof even in hot weather. They are stable and simple to use.**

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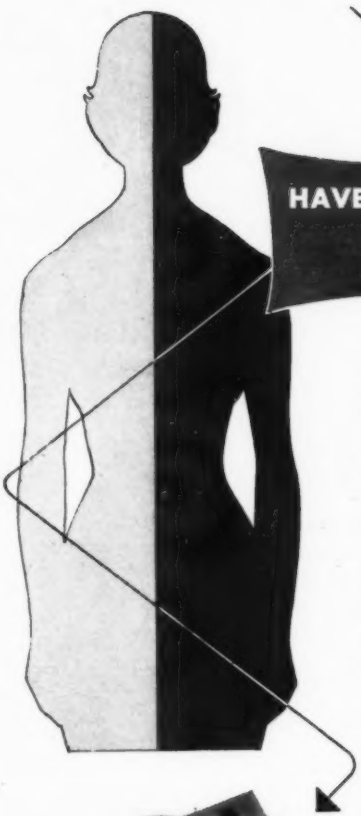

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In contraception, as in conception the "all or none" law prevails. There are no half-way measures. Since there is no such thing as a "slight touch of pregnancy," only the best method of contraception is good enough when pregnancy is contraindicated.

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1. New and Non-official Remedies, 1951, P 269.
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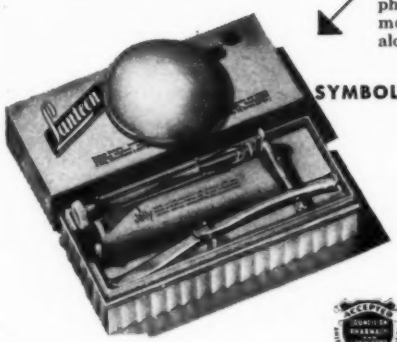


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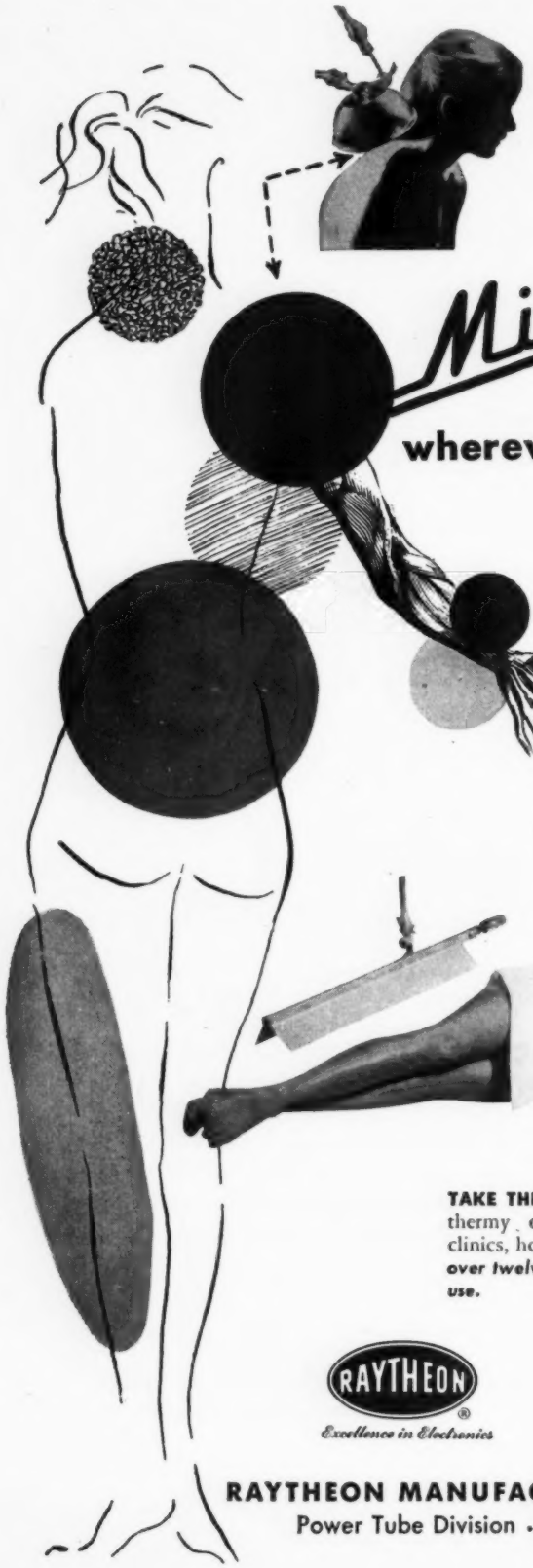

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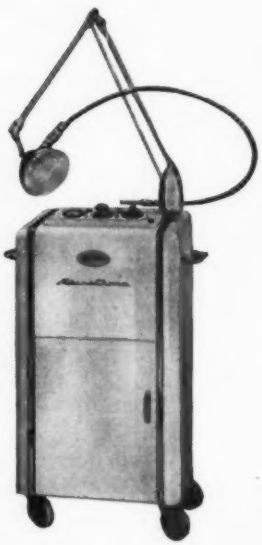

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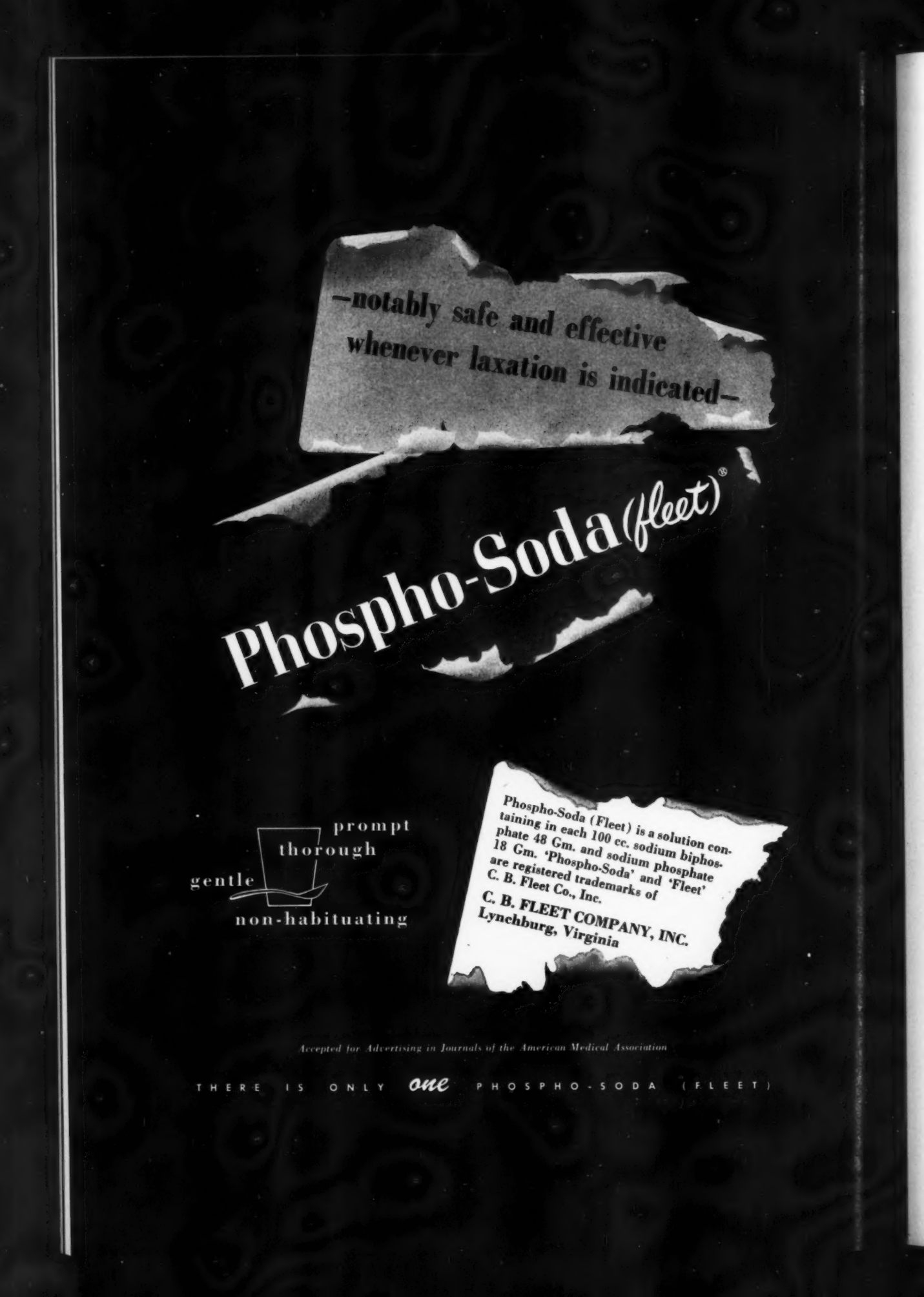
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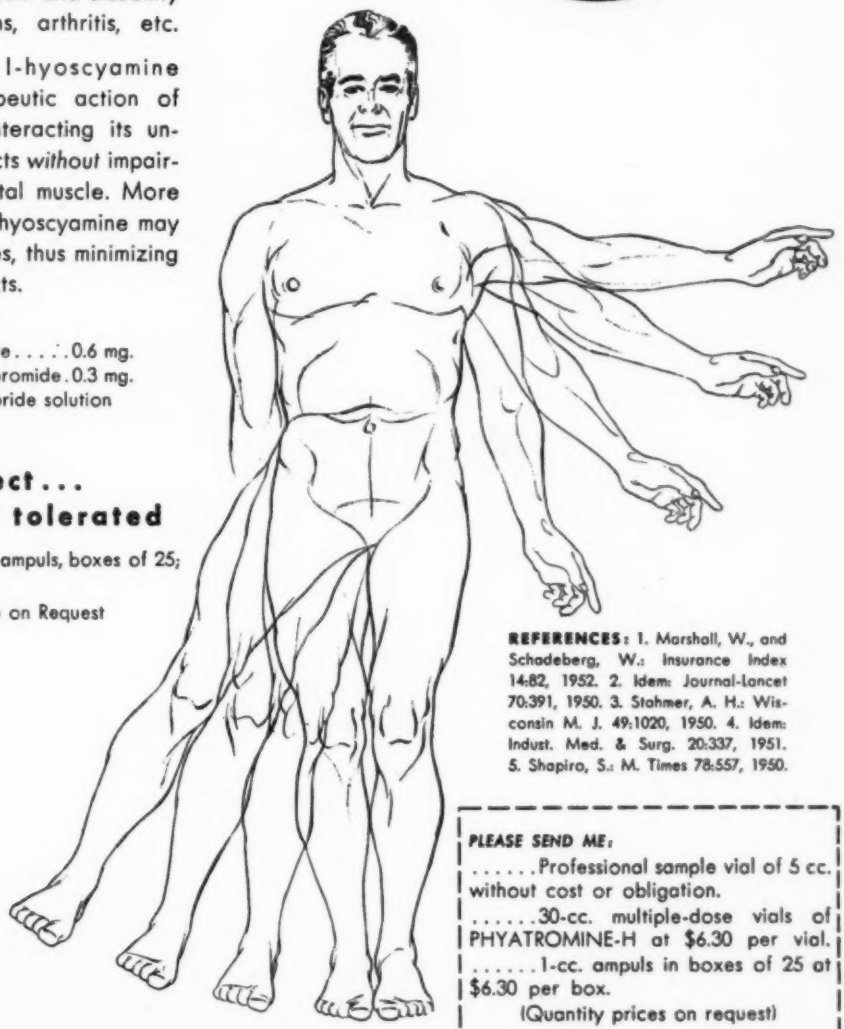

**REFERENCES:** 1. Marshall, W., and Schadeberg, W.: Insurance Index 14:82, 1952. 2. Idem: Journal-Lancet 70:391, 1950. 3. Stahmer, A. H.: Wisconsin M. J. 49:1020, 1950. 4. Idem: Indust. Med. & Surg. 20:337, 1951. 5. Shapiro, S.: M. Times 78:557, 1950.

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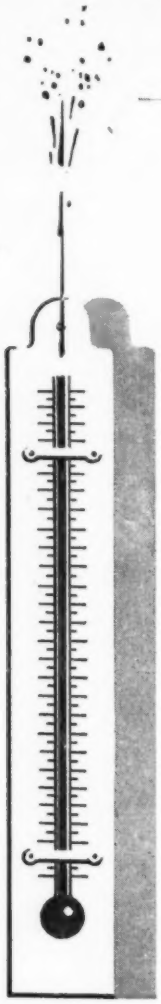

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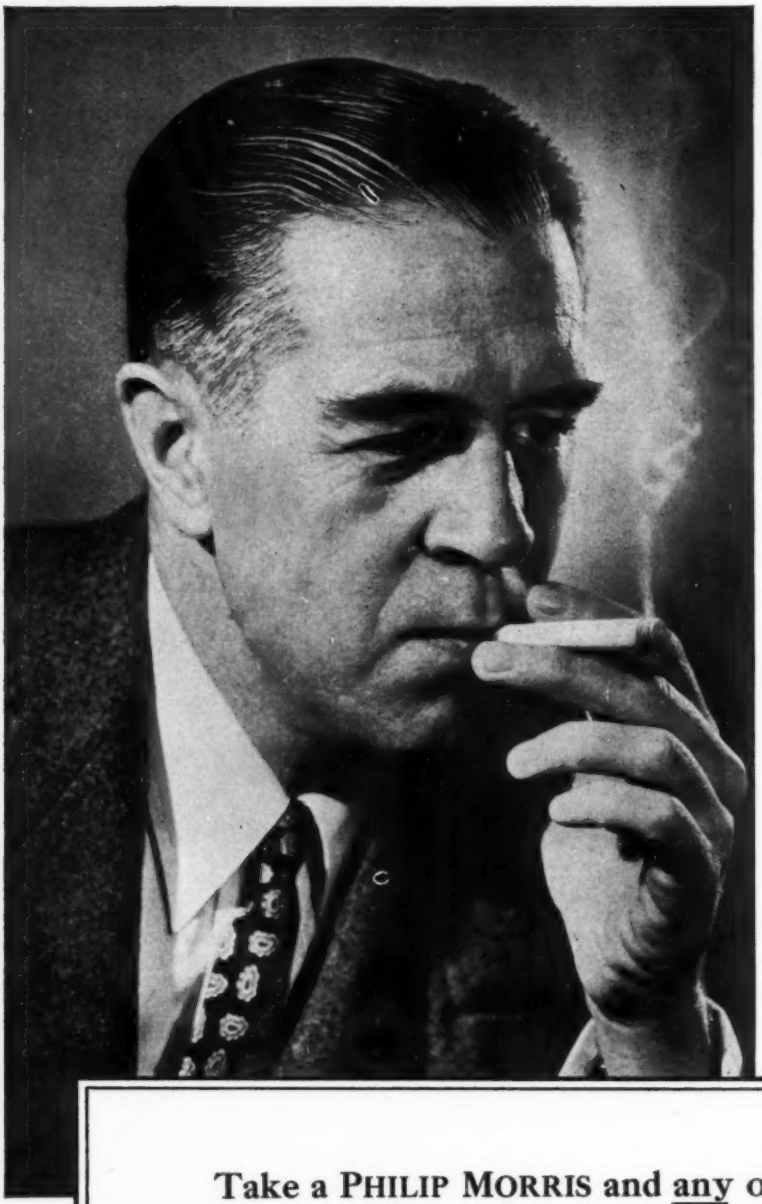

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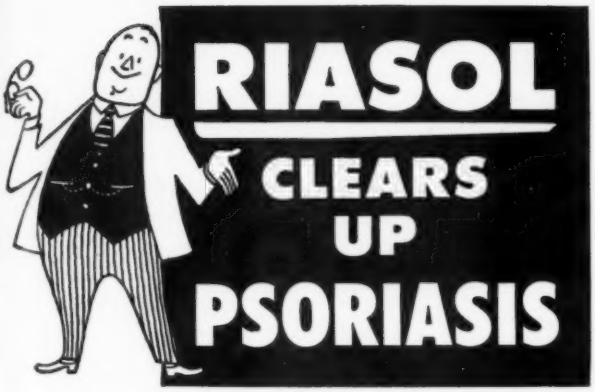


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# The Journal of the American Osteopathic Association

PUBLISHED MONTHLY BY THE AMERICAN OSTEOPATHIC ASSOCIATION

Vol. 52, No. 7 | 212 East Ohio St., Chicago 11, Ill. | March, 1953


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## Incidence of Certain Etiologic Factors in Cardiac Disorders


LOUISA BURNS, D.O.
and
CLARA L. TREAT, D.O.
Los Angeles


In discussing the causes of the recent frightening increase of deaths from heart disease, the role of strain has frequently been overlooked. Careful examination of patients showing evidence of strains affecting the nerve centers governing the action of the heart and circulation reveals cardiac pathology.[1-19] Experimental evidence indicates that certain strains do cause cardiac disorders in animals protected against any other etiologic factor.[6,20-27]

The recent increase in morbidity and mortality due to heart disease has been explained in several ways. In part, this increase is relative because of increasing life span and diminishing incidence of other diseases. There is, however, an actual increase in cardiovascular disorders and the causes of this trend seem to be numerous.

The relative incidence of certain infections and of vertebral lesions supposed to injure the heart has been studied from two aspects. In Phase I, incidence of infections among all patients reported was determined. In Phase II, the incidence of vertebral lesions among all patients was estimated, and the incidence of cardiac disorders among those with and those without lesions supposed to affect the heart was determined. Finally, the relative incidence of lesion groups in infectious and in noninfectious cardiac cases was estimated.

### GENERAL CAUSES OF INCREASING CARDIAC WEAKNESS

Certain phases of modern life affect nearly all the population. Synchronous with increasing heart disorders there has been increasing use of alcohol, tobacco, and coffee; the development of the gasoline engine and increasing use of coal-tar products, including new drugs; the development of moving pictures, radio, and television with an increasing search for excitement; increasing competition and greater use of muscles, diminishing independence of living, and of joy in quiet pursuits. During these same years we have also many conditions which should lessen disease tendencies, such as increasing mechanical aids, shorter work hours and better food through all the year, increasingly efficient sanitation, and better health care. Morbidity due to heart disease in young males seems to be decreasing. The incidence of rejections for heart disease in World War I, ages 21 to 30, was 45.8 per 1,000. In World War II, ages 18 to 44, the incidence of rejections for heart disease was 32.6 per 1,000.[28] No statistics are available for females for these periods. Diminishing incidence of acute infections affects both sexes almost equally. All these factors have been abundantly discussed in many periodicals and lectures.

### INDIVIDUAL CAUSES OF CARDIAC DISORDERS

No one specific cause for heart disease has been found. When the anatomic relations of the heart are considered, no one specific cause for disturbance appears probable. Known etiologic factors may be listed.

1. *Rheumatic Fever and Other Infections.*—This factor stands first among causes of heart disease in all reputable statistical reports. Nearly all children and young people with heart disease have had antecedent rheumatic fever.[29-31]

In all ages, rheumatic origin of valvular injuries predominates. Other infectious agents less often are recognized as causes. These include, in order of their appearance in our files, Streptococcus hemolyticus, pneumococci (strain rarely mentioned), and influenza bacilli. Subacute endocarditis and Streptococcus viridans, supposed to be most important in this disease, were not mentioned in our records. Primary foci of pyogenic infection in our case records were, in order of incidence, tonsils, teeth, female pelvis, gallbladder, and appendix. The presence of toxicogenic organisms, including Amoeba hystolytica and Salmonella, within the intestinal tract was considered important in a few cases.

In nonrheumatic infections, careful study often discloses pre-existent rheumatism.[32]

2. *Pregnancy.* — Cardiac hypertrophy, valvular murmurs, and other evidence of heart strain are considered by De Lee[33] not to be abnormal in pregnancy. Therefore, pregnancy cases were omitted from this study.

3. *Congenital Defects.*—Congenital cardiovascular defects have recently been cited as the cause of 5.7 per cent of infant mortality in the United States.[37] We have too few records in our files to justify study at this time.

There is some reason to believe that slight developmental defects may be a factor in localizing infection in the heart.[34] Since they cannot be recognized antemortem, they do not appear in our records.

4. *Cardiac Strain.*—Neither physical nor emotional strain appears in ordinary statistics as a cause of cardiac disorder, though both are mentioned occasionally in the literature.[35,36] The normal heart is not injured by emotional shocks or by the events of ordinary living. Physical strain does not seem to affect the heart unless the upper cervical or the third to the fifth thoracic spinal segments are involved. The abnormal heart may be affected by relatively negligible events. When antecedent cardiac weakness is not suspected, such negligible events may appear to cause heart disease.

Strains affecting the upper cervical or the third to the fifth thoracic segments always disturb the heart in human beings and in experimental animals. If the strain (vertebral lesion) persists, pathologic changes occur in the myocardium.

A previous study of about 2,000 case records of patients with cardiac symptoms seems to indicate that vertebral lesions have a definite place in the localization of cardiac disorders in patients suffering from chronic pyogenic infection.[38]

Ralph W. Rice described a cardiac syndrome resulting from vertebral lesions in a moving picture, "Cardiac Changes Following Certain Vertebral Lesions."[39] These changes include in order of appearance in experimental animals:

1. Changes in heart rate and rhythm, associated with dilatation of arterioles and capillaries of the myocardium
2. Petechial hemorrhages in coronary capillaries including vasa vasorum
3. Increasing hyperemia and edema of the myocardium.
4. Organization of coagula and overgrowth of connective fibers
5. Increasing myocardial fibrosis with degeneration and atrophy of cardiac muscle. These postmortem findings have been described in experimental animals.[40-43] Reversible changes in the abnormal heart of experimental animals with third or fourth thoracic lesions have been studied. Before the heart has been too greatly injured by repeated myocardial hemorrhages and increasing fibrosis, return to normal structure is to be expected if the lesions are corrected.[44,45] Reversible changes in the heart injured by other agents have not been described in available literature.[46-49]

## MATERIAL STUDIED

For this study, case records of 4,800 males and 7,300 females, a total of 12,100 cases, were classified. Those of 640 males and 665 females included cardiac disorders. These records, sent us by osteopathic physicians and institutions, were coded and copied on sorting cards. For this present study, all cases of pregnancy, labor, and early infancy were excluded. Normal persons were included, as is shown when they appear. Data derived from these case reports are as nearly accurate and consistent as is possible with material from many different sources and subject to human judgment. No patient is included in more than one category.

## METHODS

All divisions were dichotomous except as stated for certain groups. In no case was sampling employed. In Phase I cards were divided into those showing infections usually considered cardiopathogenic and those not showing such infections. Each of these was further divided as indicated below.

In Phase II cards were divided according to the evidence of vertebral strains, and each division was further divided as indicated.

Numbering and estimations followed common usage.[50,52] Incidence refers to number per thousand. Coding follows that of the United States Public Health Service.[53,54]

In this study cardiac disorders include:

| | Males | Females | Total |
|---|---|---|---|
| Endocardial and valvular disease | 74 | 109 | 183 |
| Coronary and myocardial disease | 85 | 63 | 148 |
| Functional diseases of the heart | 40 | 40 | 80 |
| Syndrome described by Rice | 84 | 65 | 149 |
| Cardiac symptoms (complicating other diagnoses) | 208 | 157 | 365 |
| Cardiac pathology (no symptoms, found in routine examination) | 149 | 231 | 380 |
| | 640 | 665 | 1,305 |

## PHASE I

*Relative Incidence of Certain Infections in Cardiac Disorders.*—

In our files heart diseases have been divided into two chief groups, those in which bacterial or parasitic invasion is mentioned as important in etiology, and those in which the cardiac disorder seems to be due to disturbances in the innervation or the circulation of the heart. In human beings it is rarely possible to eliminate infection as a cause of any given cardiac disorder. In experimental animals infections can be completely avoided. Careful autopsies can show that no infection is present or has been present during the life of the animal.

Many case records do not include an opinion concerning the importance of rheumatic or other infection. In grouping records, a history of chorea, unexplained fever with joint symptoms, "growing pains," severe or prolonged attacks of children's diseases, especially diphtheria, scarlet fever, and measles,

TABLE I. INCIDENCE OF INFECTION

| | Total | Infections | Incidence (per 1,000) |
|---|---|---|---|
| Males | 4,800 | 897 | 187 |
| Females | 7,300 | 1,851 | 253 |
| Total | 12,100 | 2,748 | 227 |

TABLE II. INCIDENCE OF CARDIAC DISORDERS IN PATIENTS WITH INFECTIONS

| | Total | Cardiac disorders | Incidence (per 1,000) |
|---|---|---|---|
| Males | 897 | 266 | 296 |
| Females | 1,851 | 430 | 232 |
| Total | 2,748 | 696 | 253 |

TABLE III. INCIDENCE OF CARDIAC DISORDERS IN PATIENTS WITH NO HISTORY OF SIGNIFCANT INFECTION

| | Total | Cardiac disorders | Incidence (per 1,000) |
|---|---|---|---|
| Males | 3,903 | 374 | 96 |
| Females | 5,449 | 235 | 43 |
| Total | 9,352 | 609 | 65 |

is considered indicative of a possible infectious origin for cardiac disorders. For convenience in these tables, the term "infection" refers only to those infections supposed to injure the heart. There is some reason to believe that mild pyogenic infections do not affect normal valves. Evidence of previous rheumatic infection has been found by Clawson and his coworkers[55] and by Libman.[56] Mechanical injury of an animal's valve, and injection of a culture of Streptococcus viridans into the blood stream have been followed by infection and further injury of the valve.[57]

## PHASE II

The second part of this report is devoted to the incidence of vertebral lesions in heart disorders.

*Expected Lesions.—*

After a study of the innervation, circulation, and pathology of the heart, of all available osteopathic literature dealing with cardiac problems, and of reports from laboratories studying the physiologic and the osteopathic relations of the heart, it became evident that vertebral lesions or other factors affecting the centers of the vagus nerves or interfering with normal nerve impulses to and from these centers or factors affecting the third to the fifth spinal segments invariably disturb the function of the heart.[20,23,25,27,58,62] These changes may be slight and are likely to be overlooked unless examination is exceptionally careful. If the cause of any functional disturbance persists, the heart undergoes progressively severe pathologic changes until it becomes unable to beat.

Vertebral lesions of the atlas and of the third to the fifth thoracic vertebrae, with adjacent structures, are here called, for the sake of brevity and convenience, "expected lesions." Records were divided according to the location of vertebral lesions, as follows:

1. Expected lesions alone
2. Expected lesions plus cervical or thoracic lesions, probably secondary to those expected
3. Lesions, but none involving those expected
4. Expected lesions plus many others (In these cases the spine is almost or quite entirely involved.)
5. No lesion reported, though slight tension or sensitiveness of the soft tissues may be present (This usually is considered to be a temporary and negligible condition so far as pathogenesis is concerned.)

A possible source of error lies in the diversity of methods and phraseology of osteopathic examiners. However, when the reports are carefully scrutinized their essential unity emerges. In coding, only reported facts are used. Varying factors in the reports consist chiefly of opinions or conclusions. Errors due to professional differences seem to be negligible and to disappear in the abundance of the reports.

Table IV shows the incidence of cardiac disorders in males with the lesion groups described above.

TABLE IV. CARDIAC DISORDERS IN MALES ACCORDING TO LESION GROUP

| Lesion group | Patients | Cardiac disorders | Incidence (per 1,000) |
|---|---|---|---|
| 1 | 383 | 165 | 431 |
| 2 | 908 | 182 | 200 |
| 3 | 1,475 | 190 | 129 |
| 4 | 1,663 | 54 | 32 |
| 5 | 371 | 49 | 132 |
| Total | 4,800 | 640 | |

Table V shows the incidence of cardiac disorders in females with the lesion groups described above.

TABLE V. CARDIAC DISORDERS IN FEMALES ACCORDING TO LESION GROUP

| Lesion group | Patients | Cardiac disorders | Incidence (per 1,000) |
|---|---|---|---|
| 1 | 549 | 141 | 257 |
| 2 | 1,477 | 152 | 103 |
| 3 | 2,580 | 316 | 122 |
| 4 | 1,368 | 41 | 30 |
| 5 | 1,326 | 15 | 11 |
| Total | 7,300 | 665 | |

Table VI shows the relative incidence of lesion groups in all patients with cardiac disorders following infections, and of those with no history of significant infection.

TABLE VI. LESION GROUPS IN CARDIAC PATIENTS IN RELATION TO INFECTION

| Lesion group | Following infection | Incidence (per 1,000) | No history of infection | Incidence (per 1,000) | Total patients |
|---|---|---|---|---|---|
| 1 | 120 | 173 | 118 | 194 | 238 |
| 2 | 168 | 241 | 160 | 263 | 328 |
| 3 | 290 | 417 | 267 | 438 | 557 |
| 4 | 42 | 60 | 35 | 57 | 77 |
| 5 | 76 | 109 | 29 | 48 | 105 |
| Totals | 696 | | 609 | | 1,305 |

Table VII shows the incidence of cardiac disorders in patients with expected lesions.

TABLE VII. CARDIAC DISORDERS IN PATIENTS WITH EXPECTED LESIONS

| | | Cardiac disorders | Incidence (per 1,000) |
|---|---|---|---|
| Patients with expected lesion | 7,372 | 1,146 | 157 |
| Patients with no expected lesion | 4,728 | 159 | 34 |
| Totals | 12,100 | 1,305 | 107 |

## DISCUSSION

The relatively high incidence of cardiac disorders among persons with history of rheumatic or certain other infections has long been known.[29-31] The relatively high incidence of expected lesions among patients with heart disorders following such infections suggests that disturbances of circulation and innervation of the heart may exercise a localizing influence. It is suggested that the prevention of heart disease should include the avoidance or the speedy relief of infections and the prevention or the early correction of vertebral strains.

These tables suggest that cardiac disorders occur more frequently in patients with normal spines than in those with many lesions not including those expected. On critical examination of the records, it appears that patients with many lesions suffer from various disorders, often so serious as to mask cardiac symptoms. For example a patient with fever or with goiter has a rapid pulse but this is not included with cases of tachycardia, since this is merely a symptom of his disease. The presence of goiter or fever does not exclude the independent heart disease, so the number of primary cardiac disorders may be diminished slightly in these and in other cases in which cardiac dysfunction is a symptom of another disease.

The category of patients with normal spines includes a considerable number with some recent injury or infection which has not affected the heart, those requiring physical examination before giving blood for transfusion, undertaking a journey, beginning a new occupation, et cetera. Since these examinations often disclose unsuspected spinal and cardiac disorders, they should not be excluded from this study.

These tables are based upon incidence alone. Only in cases of the syndrome described by Rice it is indicated that the lesion has etiologic importance. In all other cases the relative incidence of heart disease in expected lesions has only the importance properly ascribed to a higher incidence of any single factor in disease.

## CONCLUSION

The incidence of cardiac disorders in patients with atlas or third to fifth thoracic lesions suggests that such lesions have etiologic or localizing importance.

Louisa Burns Osteopathic Research Laboratory

*Acknowledgment*

*Grace Bell, D.O., College of Osteopathic Physicians and Surgeons, gave much help in planning the report and in criticizing the manuscript.*

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# Morquio's Disease (Chondro-Osteodystrophy)*

## A Study and Case History

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Morquio[1] and Brailsford,[2] about the same time and independently, described a generalized dystrophy of skeletal tissues. Brailsford called the lesion chondro-osteodystrophy; others[3] have referred to it as Morquio's disease. Grudzinski[4] published a report of a new disease analogous to chondro-dystrophy, and the radiographs of his case show a comparable appearance. This rare disease is characterized by a bizarre congenital disorder of skeletal ossification. Many degrees of dystrophy exist; the spine is usually the center of maximum involvement.

Familial distribution of the cases is a prominent feature of the disease. Morquio[1] reported four cases, all of them belonging to a family of five. Jacobsen[5] traced the disease through five generations of the same family and found twenty affected members. In this family it appeared that the trait was due to a sex-linked recessive gene, and transmission was similar to that of hemophilia. Ruggles[6] recorded the condition in the eldest, the fourth, and the seventh child of a family of seven, and two in another family of three. A 26-year-old female suffering from this disease was observed during pregnancy by Russo;[7] a stillborn child with normal skeletal structure was delivered by cesarean section.

Children with Morquio's disease are apparently normal at birth, and the disease is frequently not recognized until after the child begins to walk. Then the progressive deformity of the skeleton, which gradually leads to considerable or total incapacity, is observable. Dwarfism, associated with epiphyseal distortion, is a principal feature of the disease. The head may be normal or enlarged, but the neck is short; the spine is shortened and kyphotic from defective vertebral body ossification; the chest is barrel shaped. The extremities are short with enlarged joints caused by fragmentation and distorted retarded ossification. Ligamentous relaxation and epiphyseal distortions result in genu valgum, coxa vara, ulnar and radial clubhand, and pes planus. The mental status of the patient is usually normal.

Many of the earlier cases were confused with nutritional, refractory, or renal rickets. It is easy to avoid this error by chemical blood analysis, or by discriminating interpretation of the radiographs. The serum calcium, phosphorus, and phosphatase and the blood nonprotein nitrogen will be normal. The resistance to vitamin D therapy also excludes rickets. Symptoms resembling those of Morquio's disease are noted in some cases of severe chronic polyarthritis of infancy, as in the case of Kienböck.[8] In achondroplasia, which may also produce a dwarf skeleton, defective evolution of the process of enchondral ossification occurs during intrauterine life, but there is no evidence after birth of departure from the normal. The appearance of a kyphos suggests the possibility of tuberculosis of the spine, a diagnosis which can only be ruled out after the nature of the bone change has been determined by radiographs and adequate laboratory examination. Radiographs of the whole skeleton should be considered, for if isolated joints only are radiographed, pathologic changes found may be confused with such conditions as cretinism, localized osteochondritis, or chondromata. Scheuermann's juvenile kyphosis is a localized disease of the spine and is both superficially and roentgenographically different from Morquio's disease. Little is known of the pathology of the disease, since there have been only a few biopsies and no autopsy reports are available. Histologic examination of the skeleton has shown findings similar to those observed in chondrodystrophy and gargoylism, but more informative evidence is missing. Liver and spleen are not enlarged, nor are the corneas clouded in the typical case of Morquio's disease.

The radiographs of the skeleton show shortening and distortion, due to the degenerative changes in the cartilage and defective or absent ossification of the epiphyses. The vertebral bodies are narrowed, flattened, or wedge shaped, while the joint spaces are wide, irregular, and appear eroded. The extremities of the diaphyses are irregular, and the ossific nuclei for the epiphyses first appear as multiple anomalous islands of bone on the outer side of the thickened metaphyses. These nuclei fuse gradually, but in joints subjected to pressure the inability of the disorganized bone to withstand normal stresses and strains leads to distortion and compression of the involved bone. Also, because of persistence of nonossified cartilage islands,

Fig. 1

*Presented at the combined meeting of the American Osteopathic College of Radiology and the American Osteopathic Academy of Orthopedics, Columbus, Ohio, October 29, 1952.

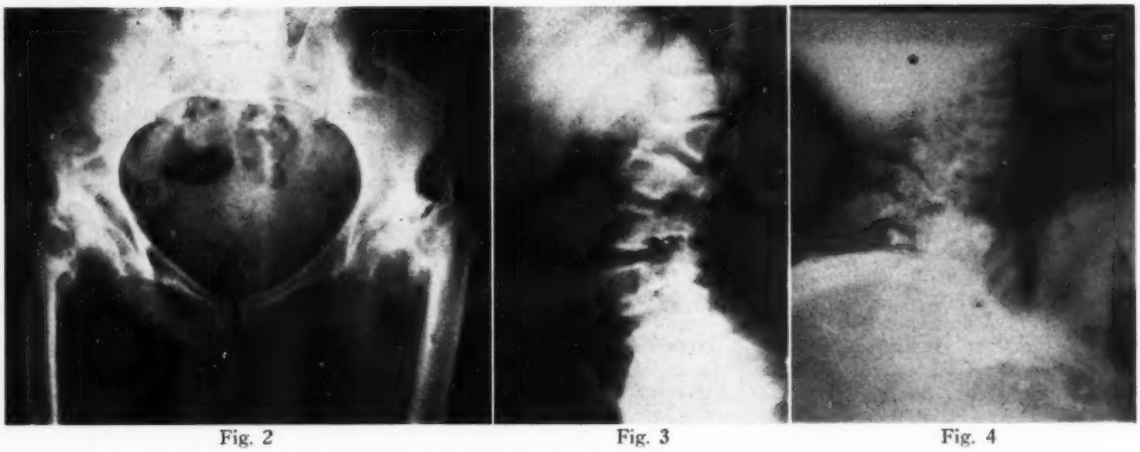

Fig. 2 Fig. 3 Fig. 4

Figs. 2-4. Roentgen studies of pelvis, lumbar region, and cervical spine.

the bone structure is blurred, and the bones appear decalcified with many areas of translucency.

The following report deals with a patient suffering from Morquio's disease, who was admitted to the Los Angeles County Hospital with a history of tuberculosis of the spine since childhood. Diagnosis was difficult because of the patient's confusing history and the rarity of the condition.

CASE HISTORY

A white male, 40 years old, was admitted to the hospital, on January 23, 1952. The patient could not walk and suffered from neck pain. He stated that at birth he was a full-term child and appeared to be normal. Before the age of 1 year a kyphos was noted in the dorsolumbar area, and deformity of the arms and legs was also becoming evident. The patient began walking at the age of 1. When he was 2 years of age he fell while trying to walk and after that could support his weight only with difficulty. Because of that difficulty he was taken to the doctor. The diagnosis of tuberculosis of the spine was made and for 14 years he was a bed patient either in a body cast or a Bradford frame. Within the last 2 years his arms have tired easily, and he has had intermittent, moderate cervical pain. Only occasionally has he complained of discomfort in the lumbar area. No history of deformity in his family could be obtained.

On admission, examination revealed a well-nourished dwarf. All joints, particularly the knees, elbows, and ankles, were enlarged. Motion was found to be restricted mostly in the hip, knee, ankle, and elbow joints. Only 5 per cent of normal function was present in the lower extremities. The neck appeared short and thick and supported a somewhat enlarged head. Some atrophy was present in his arms and legs. Further examination revealed a barrel chest and kyphos in the dorsolumbar area. Some dental caries existed. The liver and spleen were not enlarged. Neurologic examination was negative. A temperature chart was maintained, which at no time showed abnormality.

Results of laboratory examinations were as follows: Wassermann and Kahn, negative; serum calcium and phosphorus determinations, within normal range; total proteins and albumin-globulin ratio, normal. Three Mantoux tests of different dilutions were negative. Six gastric washings and subsequent smears, cultures, and guinea pig tests were all negative for tubercle bacillus. Three sedimentation rate determinations were within normal range. No abnormal findings were noted in the blood count or urinalysis.

Radiographic examination showed collapse of the atlas on the axis and wedge-shaped collapse in the first lumbar vertebra. All long bones appeared shorter and thicker than normal. There was angulation of the distal ends of the tibiae and fibulae, distal ends of the radii, distal ends of the femora, and proximal ends of the tibiae. Considerable sagging of the necks of both femora was also noted. Consolidated fragmentation and flattening of the heads of the femora and radii were present. Lung radiographs and apicograms were negative.

Treatment consisted of cervical traction and bed rest. The patient is now in a back and neck brace.

An examination of the patient in August, 1952, showed no change in his condition.

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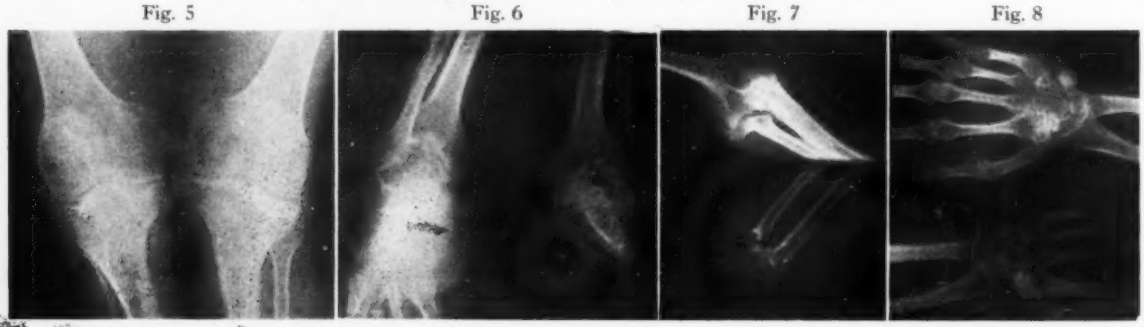
Figs. 5-8. Roentgen studies of knees, ankles, elbows, and wrists.

Fig. 5 Fig. 6 Fig. 7 Fig. 8



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# Gastric Sarcoma Coexisting with Independently Occurring Gastric and Duodenal Ulcers

## Report of a Case

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Sarcoma of the stomach is a comparatively rare condition,[1] comprising only about 1 per cent of all gastric neoplasms.[2] Approximately 5 per cent of cases exhibiting active, simple peptic ulcer of the stomach will also be observed to have concurrent active duodenal ulceration.[3] The simultaneous occurence of active duodenal ulcer and carcinoma of the stomach is so rare as to be practically unknown. The independent occurrence of gastric carcinoma and active benign peptic ulcer of the stomach is exceedingly uncommon. Extensive search of the literature has not revealed documentation of any cases of gastric sarcoma coexisting with independently occurring gastric and duodenal ulcers. Following is a report of such a case.

A 48-year-old white male was admitted to Oklahoma Osteopathic Hospital September 22, 1951. On admission his complaints included upper abdominal pain of colicky character, associated with recurrent postprandial emesis, extending over the previous 10 days. Similar attacks, usually lasting only an hour or so, and attributed to dietary indiscretions incriminating fried or fatty foods, had occurred at irregular intervals over the past 1½ years. Careful questioning regarding the effects of emotional stress revealed that such incidents initiated typical attacks that began with eructations of "burning, scalding, bitter water."

Physical examination revealed a well-nourished individual whose apparent age agreed with his stated age, and who complained of pain and soreness in the upper abdomen. Moderately firm palpation of the epigastrium and right hypochondrium occasioned evidences of deep discomfort. There was no palpable mass; there was slight upper abdominal muscle guarding but no definite rigidity per se; otherwise, the results of physical examination were diagnostically noncontributory.

Temperature upon admission was recorded as 97 degrees, pulse rate 80, respiratory rate 18, blood pressure 104 systolic and 68 diastolic. The routine laboratory survey reports were: Urine—specific gravity 1.010, clear yellow, pH 6.5, negative for albumin and sugar, and essentially negative results of microscopic examination. Hematologic studies revealed 5,110,000 erythrocytes, 12,950 leukocytes, 16 grams or 103 per cent hemoglobin, 8 stab cells, 74 segmented polymorphonuclears, 18 lymphocytes, negative Kahn, coagulation time 4½ minutes, blood type O, Rh positive.

Persistently recurrent emesis required maintenance of gastric intubation and repeated intravenous infusions during the following 4 days in which roentgenologic studies and preparations for surgical intervention were made. Pain was adequately minimized with parenteral meperidine hydrochloride.

Following is a condensation of the reports of roentgen examinations: An abdominal survey film suggested that the kidneys were of normal size, contour, and position. The liver shadow was within normal limits. The splenic shadow was not clearly identified. There was nothing significant in the enteric gas pattern. A 72 inch anteroposterior radiograph of the chest revealed that the upper and outer lung structures were essentially clear. Both hilar areas showed marked thickening with rather bold accentuation of the right lower main bronchus and with less intensive markings of the left inferior main bronchus. Throughout the middle and lower lung fields, extending through the second radiologic zone, was a fine peribronchial congestion most noticeable in the lower lung fields contiguous to the cardiac margins.

Costophrenic angles were clear and the excursion of the diaphragm good. The cardiac silhouette presented definite prominence of the pulmonary conus; no other evidence of chamber enlargement was visualized. Cholecystographic study showed a moderate concentration of dye, little altered by fatty meal stimulus; retention of dye extended beyond 24 hours; and no evidence of calculi was noted. Following ingestion of

barium solution, the stomach was noted to be moderately large, and the mucosal pattern very irregular, with definite evidence of generalized rugal fold hypertrophy. On the lesser curvature at the incisura angularis a large perforating type of gastric ulcer was visualized, the base diameter measuring approximately 1 inch and the lesion was roughly ¾ inch in depth. On the greater curvature at the junction of the pars pylorica and pars media an irregular and constant filling defect was noted, the halo extending two-thirds through the stomach. There was marked irregularity of the duodenal bulb and throughout examination a crateriform defect measuring 3/16 inch in basal diameter was repeatedly visualized on the lesser curvature side of the bulb near the apex. The duodenal sweep was not visualized during the initial phase of study due to gastric retention; at 1 hour, retention was approximately 95 per cent and, at that time, the patient's distress was so pronounced that gastric intubation and lavage were necessary.

Conclusions drawn from radiologic examination were: Chronic bronchial fibrosis with peribronchial congestion of the middle and lower lung fields; accentuation of the pulmonary conus; fair gallbladder function with no evidence of calculi; massive, perforating gastric ulcer, on the lesser curvature at the incisura angularis; antral defect, malignant in character, annular in type, on the greater curvature; and duodenal ulcer.

On September 27, 1951, under heavy Nupercaine spinal, thiopental sodium, and cyclopropane-oxygen anesthesia, the abdomen was opened through a high, left paramedian incision. Exploration revealed gastric ulcer of the lesser curvature, perforating between the leaves of the lesser omentum with associated inflammatory reaction and acute lymphadenitis of the lesser curvature nodes extending to the esophageal hiatus. The immediate extrapyloric duodenum was grossly cicatrized, the sequela of an anterior aspect, first portion duodenal ulcer in which activity was evidenced by subserous edema. There was dense infiltration of the greater curvature of the pyloric antrum. The gallbladder was tightly distended, incompressible, the walls thickened, and the lumen of the cystic duct tiny. The common bile duct was not distended. The liver and pancreas were visibly and/or palpably normal. Following preparation for resection, the duodenum was crushed through the ulcer site, sectioned between clamps by actual cautery, and inverted by three-layer technic. Then a two-thirds gastric resection was performed and angled upward to within 1 inch of the esophageal termination on the lesser curvature, continuity being re-established by modified Finsterer type, retrocolic Billroth II operation. Following visualization of the vascular-biliary duct pattern through an incision in the superior hepatoduodenal fold, classical cholecystectomy from the ducts was done. The abdomen was closed in layers. After surgery lasting for 2 hours and 48 minutes, the patient's condition was by an additional 500 cc. during the evening of the excellent. A total of 1,000 cc. of compatible whole blood was transfused during surgery and supplemented same day.

A condensation of the pathologic reports follows: Gross appearance showed a distended gallbladder measuring 8 × 4 × 4 cm., filled with very dark, thin bile; specimen of stomach open, cauliflower growth at the pylorus; and gastric ulcer, quite separate and apart from the region of the new growth. In microscopic examination, sections of the gallbladder wall showed acute changes in the mucosa and fibrosis of the extramucosal coats, the result of mixed acute and chronic cholecystitis. There was a simple gastric ulcer with loss of mucosa and simple infiltration below the ulcer with lymphocytes. Multiple sections of the stomach in the area of new growth showed very large masses of small cells, closely packed together; practically no normal mucosa was seen; a small band of connective tissue was located below this cellular growth; invasion had not penetrated through to the serosa. The growth was a small, round cell sarcoma of the pyloric antrum.

This patient's postoperative period was uneventful. He was ambulated on the evening of the surgical day. On the day following surgery, the erythrocyte count was reported as 4,840,000, hemoglobin as 14 grams or 94 per cent. He was dismissed from the hospital on October 3, 1951. Spot radiographs of the gastroenteric anastomosis were made at 6 weeks and at 4 months postoperatively; they revealed an efficiently functioning hook-up with no evidences of dumping. This patient had regained his preoperative weight level within 6 weeks following surgery. Recent communication reveals that he feels well, has no digestive complaints, and is working regularly.

SUMMARY

We have presented the report of a case of gastric sarcoma coexisting with independently occurring gastric and duodenal ulcers. Insofar as we have been able to determine by extensive search of the literature, no similar authenticated case has previously been documented. Though 1 year has passed since subtotal gastric resection and the patient is alive and apparently well, we advance no opinion regarding a possibility of surgical cure in this case at this early date.

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**EARLY IMPORTANCE OF ANATOMY FOR SURGERY**

One of the oldest of the crafts, surgery, remained essentially a therapeutic device of necessity, or of life and death, until anesthesia and asepsis made it a far more acceptable and safer instrument of therapy. In consequence, surgery has been transformed from one of the lowliest of the crafts to the dignity of a profession, enjoying respectable representation on medical faculties.

In its beginnings, surgery was influenced essentially by the accumulation of experience and was replete with all the shortcomings and prejudices of the method. With the publication by Vesalius in 1543 of the "Fabric of the Human Body," the study of anatomy came to be pursued with vigor, with a view to learning the structure of the body. This pursuit constituted one of the first interests of surgeons well into the beginnings of the present century.—O. H. Wangensteen, M.D., *Proceedings of the Staff Meetings of the Mayo Clinic*, December 17, 1952.

# Scoliosis*

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Although scoliosis has been known for centuries, it still remains one of the "great unknowns" in medicine. Scoliosis results from an attempt to balance the head perpendicularly over the sacrum in spite of some unbalancing force or forces. It is, therefore, in itself a compensation. Like many other alterations in body form or function, this process, which in the beginning is reversible and without subjective symptoms, becomes in time the site of organic pathology and requires compensatory changes elsewhere.

In this discussion there will be no attempt to make any sharp distinction between functional and organic scoliosis. Almost invariably, regardless of cause, any lateral curve is at first flexible, minor in degree, and present only when balancing in the upright position. Gradually, from the cumulative effect of the disturbing factor, the scoliosis may become accentuated, less flexible, and irreversible. Since the transition from functional to organic frequently takes place during a considerable period of growth, the result will be an asymmetric development of the skeletal tissues. The various end results will depend upon the age of onset, the location and severity of the disturbing factor, and the intangible resistance of the individual.

The etiology of scoliosis is not well understood. In the majority of cases the causative factor cannot be determined. According to Steindler[1] it results from some inadequacy or insufficiency of the spine in resisting ordinary functional stresses. Kleinberg[2] repeatedly refers to an "X factor," and Eaton[3] mentions the possibility of "some inherent muscular weakness or skeletal or central nervous system deficiency . . . possibly a myelopathy or an undiscovered virus or rickettsial infection, which does not produce marked symptoms but which does produce scattered muscular weakness. . . ."

Denslow and his coworkers[4] and Korr[5] have demonstrated that an osteopathic lesion represents a hyperexcitable segment of the spinal cord through which impulses are channeled into muscles receiving motor innervation from that segment. The sources of the irritation apparently are the proprioceptive nerve endings in the related muscular and articular tissues. These proprioceptors are highly sensitive to changes in fiber length or tension; they maintain an abnormal bombardment of impulses as long as the irritation persists. This irritability has been frequently found to be quite different in degrees in the tissues on opposite sides of the same segment. Correspondingly, the muscle tension on one side is greater than on the other. When such a lesion persists in a child during active growth, it may possibly be the "X factor" in the etiology of scoliosis. A lesioned segment is less able to withstand the usual mechanical stresses of activity and weight bearing than is a normal segment. Pearson's[6] serial studies of posture in grade school children may be helpful in clarifying the pathogenesis of scoliosis.

With the possible exception of a curvature due to unusual leg length, a simple C curve cannot exist in the upright balanced position without one or more other curves. The patient will allow the spinal column to be distorted as necessary to bring the center of mass over the base of support, and to maintain the head in a level position. The primary curvature is likely to be most definite and persistent because the causative factor is either within it, or has acted upon it more directly and for a longer time than in the associated secondary curves. The secondary curves may be above, below, or both above and below the primary one. In many cases of organic S-type scoliosis, it is difficult or impossible to determine which curve is more fixed and therefore primary. The conclusion in these instances must necessarily be that the scoliosis was the S type in its early functional stage.

The change from functional to organic within a given curve occurs quite gradually. Soft tissues are affected earlier than osseous tissue. Approximation and shortening occur on the side of the concavity and lengthening on the convex side. The intervertebral disks, especially near the apex of a curve, become wedged from the one-sided weight bearing and the impaired nutrition due to decreased motion. When the disk is subjected to a decrease in the alternate compression-decompression effect of motion, the passage of nutrient fluid in and through the disk is correspondingly impaired. Since the undernourished disk is less resistant to compression, the thinning is progressive. The related ligaments, muscles, and fascia become increasingly fibrotic. This is manifested by decreased active and passive motion, especially in the direction of straightening the curve. This functional limitation serves as a reliable index of the degrees of change from the functional toward the organic type.

While the spinal column of support becomes increasingly lateroflexed and rotated as a curvature develops, the walls of the chest and abdomen—including the diaphragm—undergo proportionate changes in contour. The contained viscera must accommodate themselves in individual form and relative position to the space provided at the time. Usually the scoliosis develops slowly enough to allow the organs to compensate for the change and maintain satisfactory function. However, the greater the amount of structural and functional compensation demanded permanently, the less will remain available for times of stress.

Severe scolioses usually have their onset in childhood when the ratio of organic to inorganic substance in the bones is high. In accord with Wolff's law, the final shape and internal structure of the involved bones form an accurate record of the habitual stresses which have acted upon the plastic osseus tissue. The bodies of the vertebrae at or near the apex of the curve are wedge shaped with the lamellae of internal spongy bone short, thick, and more numerous on the side of concavity. The vertebral body at the transition point between two lateral curves appears oblique or rhomboidal in shape, indicating that it has been subjected to torsion stress in one direction from above and in the opposite direction from below.

The vertebral arches especially near the apex of the curvature are comparatively short, thick, and rugged on the side of the narrowed body of the

*Presented at the Teaching Sessions, Fifty-Sixth Annual Convention of the American Osteopathic Association, Atlantic City, N. J., July 16, 1952.

vertebra. This is especially true of the pedicles and articular processes. The facets on the side of the arch corresponding to the concavity may have twice the area of those on the opposite side. The vertebral foramen of a wedged vertebra is irregularly distorted with the narrow part on the side of the concavity.

The transverse processes tend to remain horizontal throughout the curve. Above the apex they appear to be bent downwards on the side of the convexity in relation to the plane of the vertebral body; on the side of the concavity they are bent upward. The opposite holds true below the apex. This relatively level appearance of the transverse processes as seen on x-ray or in the scoliotic cadaver can be rationalized by considering the probable tension from the attached soft tissues as the distortion developed. The spinous processes remain closer to the original mid-line than do the corresponding vertebral bodies. They tend to bend forward the concavity of the curve, especially in the region of the apex.

Since the vertebral bodies rotate toward the side of the convexity and this rotation is greatest at the apex of the curve, the transverse processes—and, in the thoracic area, the corresponding ribs—will be displaced posteriorly on the convex side and anteriorly on the concave side. This is revealed most readily on the patient in the position of forward bending. In a severe dorsal curvature the ribs on the convex side are more horizontal, sharply curved, and prominent at the angles with flattening of their anterior portions. On the side of the concavity they are more vertical, more curved and prominent anteriorly, with a flattening or decrease in the angle posteriorly. The sternum tends to remain near the original mid-line, but its lateral margin is usually more prominent on the side of the concavity of the curve.

If the scoliosis is low enough in the spine to involve the sacral vertebrae before their time of fusion, it may be characterized not only by a curve in the fused sacral bone but also by a distortion of the innominate bones caused by transmission of the same stress to the pelvic ring. This accounts for some of the unequal oblique pelvic diameters encountered by obstetricians.

The study of the skeletal tissues of severe scoliosis reveals the action of the compensatory functional stresses made necessary by the primary disturbing factor. It appears, however, that usually no single causative agent can be established by any specific series of compensatory changes. There are notable exceptions to this, but the idiopathic group includes the majority of cases and some of the most severe. If the cause of the disease cannot be determined, it naturally cannot be eliminated; we must then use our knowledge of the compensatory mechanism in preventing or reducing subjective symptoms. The longer the scoliosis can be kept in the functional stage, the less likelihood there will be of later interference with useful activity and comfort. Unfortunately, the disease is frequently well advanced when the physician is consulted.

In the management of early scoliosis in a child, obtaining proper cooperation in postural training and exercise is usually difficult, even with the cooperation of the parents. Flexion tends to exaggerate a movable lateral curvature by bringing a greater proportion of the superimposed weight forward from the arches to the vertebral bodies. The child should be reminded to avoid a slumped posture; exercises in extension are indicated. If the body weight is excessive, it should be reduced by whatever methods are appropriate in the individual case. Swimming is an excellent exercise to develop the trunk muscles symmetrically while the spine is free of superimposed weight. Exercise on a horizontal bar or other overhead gymnastic apparatus will produce a beneficial traction especially on the concavity of any lateral curve below the shoulder region. A simple horizontal bar for use in the doorway of a room in the home is convenient and very useful. The patient is instructed to grasp the bar and suspend part of his weight while the spine is relaxed and the feet remain on the floor. Any exercise which includes jumping or lifting may exaggerate a scoliotic curve. In the usual case, especially in a child, it is impractical to attempt specific remedial exercise, because a movement which may reduce a curve in one area may exaggerate an adjacent curve to the opposite side.

The manipulative treatment should be planned carefully in accord with the mechanical indications and the resistance in the tissues. Force should be directed exactly where passive motion is limited. It should not disturb the adjacent, more normal tissues. The amount of force should be no more than enough to accomplish the release of abnormal tension.

The ideal treatment would be that which could improve the action of the intrinsic sustaining forces. Inhalation is the more active phase of respiration. Forced inhalation calls into bilateral action a number of accessory muscles of the trunk, including those of the spine. This intrinsic force tends to decrease the curves of the spine, both the physiologic anteroposterior curves and the abnormal lateral ones, unless they are in a state of organic rigidity. In the treatment of scoliosis the greatest need for corrective lateroflexion force is usually near the apex of the curve, where the tendency to wedging is most definite. In order to obtain the maximum from inhalation, the patient is instructed to exhale completely until he must gasp for breath. The physician, during the patient's sustained exhalation, should hold the joint to be treated in a position within its easy range of motion but approaching the position of exaggeration of the lesion. As the patient suddenly inhales, the physician should allow the joint to "recoil" in the direction of correction of the lateroflexion and rotation. He may at the same instant add a slight corrective thrust if necessitated by resistance encountered. Sutherland[7] uses this principle of invoking the respiratory cooperation of the patient to utilize the intrinsic corrective and recuperative forces of the tissues as an aid in the reduction of lesions. Usually in the treatment of scoliosis the problem of maintaining the correction is much greater than that of obtaining the correction. The gentle nature of this method obviates the danger of overtreatment which may result in decreased tissue tone and exaggeration of the movable curve.

The vertebra at the apex of a lateral curve has not only been subjected to the greatest lateroflexion stress, but has rotated from its original position farther than any other segment of the curve. This is true in each part of a compound or S-type curve. Each apex represents the extreme of rotation in opposite directions and the segment at the transition point or "crossover" between the two curves is subjected to the greatest torsion stress. In the derotation treatment of this scoliotic pattern, opposite rotary forces are applied with appropriate lateroflexion simultaneously at the apices, and are allowed to meet at the transition

*(Continued on page 390.)*

THE JOURNAL OF THE
AMERICAN OSTEOPATHIC ASSOCIATION

Published monthly by the American Osteopathic Association

Publication Office, 100 S. Kenilworth Ave., Oak Park, Ill.
Editorial Office, 212 E. Ohio St., Chicago 11, Ill.
Address all communications to the Chicago Office

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Subscription . . . . . Ten dollars a year in advance

Vol. 52 March, 1953 No. 7

## PUBLICATION PLANS

Plans have been made to remake THE FORUM OF OSTEOPATHY from cover to cover and to add to the number of its pages. Less than a year ago it was stated editorially[1] that THE FORUM should become more definitely "the voice of organized osteopathy, speaking to the entire profession." The editorial pointed out that:

> The time has come to make the voice of the osteopathic profession widely heard. The fact that we have a great diversity of thought and sharp disagreement among our various groups is not a matter for regret. In itself such disagreement is a sign of a vigorously growing and developing profession. Amalgamation, absorption, or liquidation is not waiting at the doorstep of such a group. THE FORUM is a logical medium for recording growth, development, warning, and dissent, as it reaches out to a great profession, inculcating a sense of unity that will enable it to close ranks when danger threatens.

The expanded FORUM, however, constitutes only a part of a larger plan for all the publications. The Board of Trustees of the American Osteopathic Association at its December meeting concurred in the recommendations of the editors that the entire editorial department be reorganized, and the staff increased in number, making possible an increased publication service on a broad front.

The present high standard of articles of a general and specific nature will be maintained in THE JOURNAL. But plans are being made to inject into it more material of practical and immediate usefulness to the general practitioner. An opportunity will be given osteopathic institutions to report their unusual or interesting cases, emphasizing their clinical aspects. A continuing effort will be made to improve the supplements from the specialty colleges. Special articles will feature the significant and the unusual. The lead article for the month; as nearly as possible, will reflect fundamental osteopathic philosophy. THE JOURNAL will remain the scientific publication of the profession, but its editors will strive also to make it the most useful clinically.

A special committee has been set up by the Board to study the purpose of OSTEOPATHIC MAGAZINE in relation to the profession's need for a health magazine. Many in the profession feel that this publication should be realistically adapted to the profession's need for a publication which will tell the story of the osteopathic physician who has become a factor in the entire health life of many communities. The work of this special committee will be reported in greater detail in these columns. But first on the agenda is the redesigned FORUM.

The new FORUM will combine its present features with a series of sections presenting every facet of professional growth and development. Affiliated organizations will be apprised of the plans for making THE FORUM a clearing house for news of their plans and activities. Representatives of these societies have already expressed enthusiasm for a full reporting of activities which may be specialized in character but which have national significance in that they mark the advance of osteopathic medicine. District societies, hospitals, clinics, osteopathic colleges, specialty groups, the national auxiliary, and other bodies will each be assigned a section. The reader will soon become accustomed where to find the news which interests him and will find a growing interest in all news. THE FORUM's strong editorial policy will be continued, aimed both to inform and to interpret. In every way possible THE FORUM will be made a broad channel of professional advance and will carry this news to the profession. The profession approaches a period which promises to be the most interesting and challenging in all its history. The day has come for THE FORUM to realize upon its rich reserve of potential worth to every doctor of osteopathy, nation-wide. The osteopathic profession has become rightfully proud and conscious of the possibilities of its future as an unlimited school of the healing arts and the distinctive contribution it has to make, a contribution in no way to be limited or segmented. THE FORUM is to become a forerunner of the profession's new day.

## COLLEGE OF GENERAL PRACTITIONERS

It is a privilege for THE JOURNAL to present officially the youngest professional organization in osteopathic medicine—the American College of General Practitioners in Osteopathic Medicine and Surgery. This new group is one of the most important to arise in our profession's history, but in order to appreciate its function and to understand its meaning the reader must know something of the forces which gave rise to it and in reality demanded its creation.

This newest "specialty" college, for it is in the anomalous position of being like a specialty college, without being one, is not something new in medicine. The Academy of General Practice, a section of the

1. Editorial: The Forum of Osteopathy. J. Am. Osteop. A. 51:449-451, May 1952.

American Medical Association, has been established for several years and has become a going organization. Quite recently word has come from England of the organization there of the College of General Practitioners. Unthinking or uninformed individuals, both within and without our school of practice, will dismiss the College of General Practitioners in Osteopathic Medicine and Surgery as mimicry. A few doctors of osteopathy, without looking beyond their own horizons, will brand the new College as unnecessary and useless, saying that there are organizations already in existence that could well serve the needs of general practitioners. To this the answer is simple. The Board of Trustees of the American Osteopathic Assosciation gave 2 years of careful and detailed study of the need for such a group and the way in which it could serve those needs before it recognized its affiliate status.

Organizations of general practitioners spring from the same roots and, paradoxical as it seems, out of conditions similar to those which brought specialty colleges into existence. The growth and development of specialty colleges has been inevitable. During the past quarter of a century the progress of medicine has been so rapid that no one mind could keep abreast. As a result, specialization took the center of the stage.

Groups of men, interested in a common field and determined to conserve the newer knowledge and skills acquired by their study and experience, bound themselves together so that they might evolve specific graduate education programs. And they were determined, too, that they should have the status necessary to forward their work both among their colleagues and the public. Thus arose the specialty college, primarily as a teaching institution, academic, educational, and non-political in type. Within the last decade they have justified, both to doctors and to patients, their existence. The specialty college by necessity is a part of organized medicine, osteopathic and old school, because only through organization are groups able to exercise influence and wield power.

Necessary as is specialization, it brought in its train distinct problems. The patient, on one hand, has attempted to divide himself; the doctor, on the other hand, has aided and abetted the segregation and segmentation of medicine. Man the patient is indivisible, physically, mentally, and spiritually. And medicine evolved for man the unit. The physician, as the healer of man, must be the master craftsman, concerned with human totality. Specialization tends to make man an appendage to the doctor's particular specialty.

Specialization has much to its credit, not the least of which is the improvement which it has brought to the whole of medicine. The specialist, by his intensive study and his opportunity for depth of experience in special fields, has produced intricate pieces of a puzzle which fit together to make a clear picture. Within the last decade, however, it has become apparent that the great contribution of medical specialization is a negation. Specialization has proved its right to existence only because it is clearly evident that no specialty of medicine can stand by itself, that a specialty has meaning to the degree that it merges itself with the entire picture of medicine. It is medicine which is one of the great disciplines of man's knowledge and no one of its single parts.

A newly awakened interest in general practice and in general practitioners is no superficial or passing thing. It roots deep, and it was covered but momentarily. The doctor emerges out of the mists of prehistoric time, ministering to the needs of the tribe. The tribe of yesterday is the nation of today and the mankind of tomorrow. And in that totality there is no forseeable future in which the individual will not need an intimate personal service to which he can turn for assistance and guidance in time of physical or mental distress. His first need is a sense of security and an actual protection against the ordinary hazards of illness or injury. And that service is not to be found in the specialties of medicine or their practitioners. It can be given only by the general practitioner or family doctor. He is re-emerging everywhere in response to man's consciousness of his own need for survival.

A vague sense of the role of the general practitioner as unfilled was brought into sharp focus by the report of the President's Commission on the Health Needs of the Nation. Here the suspect became the actuality, made concrete by facts and figures. It is in such light that the real purpose and function of the family doctor is seen clearly. The need for colleges and academies of general practice in any complete system of medicine is beyond the ambitions of groups of men seeking a place in the sun.

Thus far, what has been written applies to medicine generally; therefore it applies to osteopathic medicine as one of the two organized systems of practice. But the purpose and function of osteopathic medicine are not only those of medicine generally; they are also specific and particular. It is in this relation that the American College of General Practitioners in Osteopathic Medicine and Surgery should be examined, if our profession is to understand the importance of its latest group, so earnesly dedicated to the advancement of osteopathic medicine.

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## COMPREHENSIVE MEDICINE

Change in every phase of man's life has become global in its sweep. The resulting upheaval is most apparent in Western civilization, least evident superficially on this continent, although even in the United States, the foundations of "our way of life" are being shaken.

Education, so much a part of our scheme of things, is being modified by the forces at work, causing thoughtful men to question anew its fundamental purposes. Should education attempt primarily to enrich the life of the individual, or should it above all else ready him for service to the state?

Medical education likewise finds itself thwarted in many of its purposes, hampered in attaining its objectives, and confused in its answers to the problems that arise out of the times. Many of these problems

are practical in nature, coming directly from a public concerned with how to select a physician, how to be certain that he is competent, and especially where to find general practitioners capable of and willing to give good medical care. And overshadowing all of these is the question of how millions of our people can meet the mounting cost of good medical care.

The 1952 annual report of the Commonwealth Fund is of fundamental significance to all who are responsible, directly and indirectly, for medical education. And the report carries specific significance to the leaders of professional education in osteopathic medicine. Osteopathic educators will recall that the first of the great reports on medical education, the Flexner survey in 1910, "Medical Education in the United States and Canada," was a masterpiece of vitriolic appraisal. The report did not spare allopathic or homeopathic schools, and it dismissed osteopathic schools with the utmost disdain. In the decades that have elapsed since the Flexner report, however, all medical education finds itself in a different world and one in which four decades of progress are being subjected to critical study.

In a recent review of the 1952 Commonwealth report in the *New York Times,* Dr. Howard A. Rusk, associate editor, calls attention to that report's division of medical education into three phases of adjustment. Its first phase was initiated by the Flexner report, which furnished a blueprint that has lasted for 40 years, and which made "scientific medicine . . . its objective and slogan, specialization . . . its dominant pattern, and the university medical center . . . its preferred instrument." Medical education today is still operating largely by the pattern cut out from 1910 to 1920, so effective was the Flexner influence.

We are reminded by Dr. Rusk that in 1910 there were 165 medical schools, some of which admitted students directly from high school and others which took older students with only a grade school education. Osteopathic education at that time was only attempting to orient itself, a trend not even conceded by the Flexner report. It was a period, too, as Dr. Rusk opines from the observations of others, when ". . . a random patient with a random disease consulting a physician at random stood better than a 50-50 chance of benefiting from the encounter." It was not without reason that osteopathy, in spite of its immaturity as a school of medicine, made such a remarkable contribution to the public health during those years.

The first phase of medical education referred to by the Commonwealth report was based upon the evolving principles of the basic sciences. Physiology then offered the most exact information about the patient, hence, clinical judgment during this phase has been grounded almost entirely upon this particular knowledge of man. The report points out that in recent years developments in psychology, anthropology, sociology, and other behavioral and social sciences, has afforded broader knowledge to the physician, so that he is no longer limited to an evaluation of the patient's biologic functions. Hence, the report reasons that we are now in a second phase of medical education. The patient has become an individual to be considered in relation to his milieu and its effect upon him. But this second phase, termed by the report as that of comprehensive medicine, should be considered as only transitory. The first effect of the second phase has been to modify the definition of scientific medicine, so that some medical colleges have begun to re-examine their functions and achievements.

The Commonwealth Fund report predicts that it is reasonable to hope that this transitional phase will be followed by a third phase of medical education in which there will be some "reconciliation between what has been called scientific medicine and what is now called comprehensive medicine, some better adjustment of the specialist to the generalist, and some restructuring of both medical education and medical care to fit the needs of a more knowledgeable social order."

A reaction against the extremes of specialization in medicine is already apparent. Medical educators are becoming aware that the establishment of certain of the physical and biologic sciences as foundational to the training of a physician has been accompanied by a neglect of other fields of knowledge also fundamental to the physician's training, that is, the social sciences and the humanities. Authorities in medical education point out that medicine must be made whole. Leaders in osteopathic colleges reiterate that it is to man the unit that physicians must minister. A medical education that grows out of an integration of these two points of view can result in the third phase of medical education that is envisaged by the Commonwealth report.

In closing his consideration of the Commonwealth report, Dr. Rusk quotes from the 1951 report of the Rockefeller Foundation as apropos of the entire discussion:

"Change is essential for any organization that hopes to remain adapted to the needs of a changing world. Shift in emphasis and new departures are in no sense a criticism of past policies which have been carried to a point where reorientation is possible. The objective is to develop a program that is devoted to the clarification of basic principles rather than the demonstration of finished technologies that are applicable only in the economic and cultural context in which they were developed."

One must bear in mind that this quoted statement was made by an organization which has given $123,800,000 for medical education and research in the medical sciences since 1914. The Commonwealth report now calls for shifts in emphasis and new departures in education in an endeavor to meet the needs of a new age. But such shifts in purpose and policy will bring to light difficulties inherent in medical education per se. Medical schools have become great institutions, and jealous of their own vested interests. Responsiveness to trends becomes almost impossible in monumental institutions and organizations. Status quo becomes a desideratum in which the paralyzing effects of the aging process are by no means limited to the animal body.

A perusal of the Commonwealth report, however, suggests that osteopathic education may now be well along the way toward the comprehensive phase of medical education, by the very force of circumstances in which osteopathic colleges are sufficiently fluid to be quickly responsive to change. The phenomenal growth and development of osteopathic institutions in the last decade suggests this. Authoritative observers, objectively minded, in visiting our schools have remarked upon the ease of accomplishment, the efficiency, and the totality, with which our purposes in medical education are attained. Convincing proof of this lies in the number of osteopathic physicians who are making a place for themselves in communities nationwide, rendering a service which would be welcomed by hundreds of like communities were other doctors available. A striking number of doctors of osteopathy are now fulfilling what has been recently described as the purpose and function of a physician—the purpose, the ordinary business of life, "that of making a living," the function, "to guard and conserve the health of a part of the population." Adequate fulfillment of both the purpose and function of a physician by doctors of osteopathy is in itself a favorable critique of osteopathic education.

A study of the commonwealth report will not discourage the leaders of osteopathic education. As they re-examine in the light of this report the purpose and policies of osteopathic education of the last decade, they will be heartened by the unity of purpose and breadth of vision evinced by our professional education, as it moves forward within the osteopathic concept. Osteopathic education is making it possible for the osteopathic physician to practice a comprehensive medicine well in advance of the trends in that direction.

## Notes and Comments

The retirement of Dr. Louis I. Dublin, Statistician of the Metropolitan Life Insurance Company, after 44 years of service, should not escape the notice of any physician, for Dr. Dublin, through his campaigns of education and prophetic leadership, has played a great role in helping to advance the health of the American people. His life, devoted largely to a private enterprise, is an example of how under the American way a life can become a social contribution as much as if it had been directly publicly connected. He organized the Statistical Bureau of his company in 1911 and has been its chief ever since. The *Statistical Bulletin* in which much of his work and that of his associates has appeared, has long been the authoritative publication of its kind, carrying an unquestioned authenticity "on the facts of life from birth to death"—incidentally, the quoted phrase is the name of the last but one of his major works. It appeared in 1952 and was reviewed in THE JOURNAL. Every socially minded American and especially those medically connected will wish Dr. Dublin many years of the rich and productive living for which he is so well prepared.

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Facts from the December, 1952, *Statistical Bulletin:* There were approximately 1½ million marriages in the United States in 1952, a drop of 4 per cent since 1951 and of one third since 1946, the all-time high of more than 2 million. This is not to be interpreted as the result of reluctance to assume the responsibilities of marriage but is actually a reflection of the depletion of the supply of eligibles in the population by the high marriage rates during World War II and the immediate postwar period. No real rise in the marriage rate may be anticipated before the early 1960's, when the large crop of war and postwar babies begin to enter the marriageable lists. . . . Accidents claimed 95,000 lives in the United States during 1952, the second year in a row to show a rise in fatal mishaps. Motor vehicle accidents were at least equal to the 1951 total of 37,300. This type of fatal injury accounts for two fifths of all deaths from accident. Mishaps in and about the home accounted for 28,000 killed. Catastrophes—accidents in which five or more persons are killed—in five out of seven major cases involved aircraft. The railroads did not experience a single catastrophe in 1952. Motor vehicle mishaps accounted for about one third of all catastrophic accidents. . . . The United States increased its population by about 2,675,000 in 1952, the births setting a new high of 3,875,000. At the end of 1952 natural increase and immigration brought the total population of the country to more than 158,400,000, including our armed forces overseas. Since the decennial census of 1950, the population has gained about 7,275,000, a figure which is not much less than the combined populations of Chicago, Los Angeles, and Detroit. Estimated population of our country before the close of 1953 is beyond the 160 million mark.

★ ★ ★

A symposium on the treatment of essential hypertension is the subject of the November 19, 1952, issue of the *Proceedings of the Staff Meetings of the Mayo Clinic.* It is valuable because of its evaluation of a new drug, N-phenoxyisopropyl-N-benzyl-betachlorethyl amine hydrochloride (known as Dibenzyline or 688-A); Veratrum viride in use for more than a century; potassium thiocyanate; sodium nitroprusside; and hexamethonium, which is a newer drug. Dibenzyline is rated as needing further study in the treatment of essential hypertension. Veratrum is considered

palliative and not curative. Many patients cannot tolerate the drug in therapeutic doses. The thiocynates have been re-evaluated, found useful in selected cases( relatively young patients with labile blood pressure who have severe headaches), but must be used with caution and with periodic determination of the level of cyanates in the blood. Sodium nitroprusside appears to produce a quicker and more impressive hypotensive effect than the administration of the cyanates. Its long-term use also calls for periodic determination of the cyanates in the blood. Hexamethonium is hazardous. It should be used only with thorough knowledge of its side effects. The symposium closes with a survey of opinion about sympathectomy for essential hypertension. This article should be read in its entirety as should the entire symposium. Publications of the Mayo Clinic have long been characterized by an objectivity and conservatism of high order, and consistent with a truly scientific attitude of mind applied to clinical problems.

★ ★ ★

A new publication joining the great body of medical literature is *Obstetrics and Gynecology*, an official publication of the American Academy of Obstetrics and Gynecology. Publisher is the well-known Medical Book Department of Harper & Brothers, Paul B. Hoeber, 49 East 33rd St., New York 16, N. Y. The periodical is issued monthly; the subscription price is $12.00 a year. The physical make-up of the journal is one of character and attractiveness. The paper is of top quality, the type face is graceful, the two-column format makes for rapid reading, and the plates are sharp.

The avowed purpose of the publication is especially to be commended. It is to serve the active clinician, the family physician to whom, the editor points out, the majority of women turn for obstetric and gynecologic care.

The first number of *Obstetrics and Gynecology* contains twelve regular articles, shorter in length than are usually found in specialty journals, written very directly and with little exhibition of technical jargon. They are teaching articles, not those of the investigator; practically informative, but reflecting the precise and scholarly standards of modern medicine. The regular reader will find that the articles move rapidly for him because of mechanical make-up, simplicity of expression, and sustained interest.

An article at point in the new journal is "Threatened and Repeated Abortion," by Arthur C. King, M.D., which discusses the present status of therapy for pregnancies which threaten to abort. It is a valuable review of recent periodical literature, widely selected from authoritative American sources, several British sources, and one German source. The author points out that the incidence of threatened abortion is now reported as from 3.9 to 26 per cent of all pregnancies. Actual abortion is said to occur in from 5.5 to 18 per cent of all pregnancies. Modern literature offers no method of treatment of either threatened or repeated abortion that is conclusively demonstrated as superior to any other method. The author stresses the necessity for evaluation of the individual patient on the basis of the correction of those anatomic and physiologic derangements that might make the patient susceptible. That evaluation made, King emphasizes the importance of psychotherapeutic factors as causes, especially in cases of repeated abortion.

The clinician will appreciate the frank appraisal which the author of "Threatened and Repeated Abortion" gives his subject in which admittedly the treatment elected will have "a small medical value." And the article itself perfectly illustrates the difference between the routine medical approach to the problem of disease and that offered by osteopathic medicine.

The difference here is not related to success or failure in the treatment of this condition, nor is the claim made that osteopathic medicine possesses a therapy of specific value in this problem. Allopathic approach places an agent or an etiology causal to a given end result. On the other hand, as Northup, Korr, and many of our writers emphasize, the osteopathic philosophy of disease calls for an approach in which individual response becomes the problem for fundamental investigation, a response predetermined at least in part by his nature rather than by the agent or agents which then become secondary factors responsible not for disease but for diseases. Osteopathic medicine has arrived at a stage in its development when it should institute studies of such specific problems as this of threatened abortion in an attempt to find a possible pattern of abortion response common to certain individuals, granted the presence of various causal agents. Only in this way can medicine establish a systematic basis for treatment rather than employing an empirical approach such as is now most commonly utilized.

★ ★ ★

The December issue of the *Journal of the National Cancer Institute* contains a comprehensive article, "An Overall View of the Cancer Problem," by Dr. John R. Heller, Director of NCI. The scope and nature of the cancer problem, the application of cancer research to cancer control, environmental cancer, clinical research, and the changing concept of early diagnosis are among the important topics treated. Dr. Heller writes, "To be truly effective [cancer control] must have the wholehearted support of government agencies, of voluntary agencies, professional and civic groups, and industry, and above all, of each and every professional man and layman." Every osteopathic hospital serving a definable community area should consider it its responsibility to provide some type of organized tumor diagnostic service to that community, as provided by the known technics of that type of clinic. The cancer teaching grants of the United States Public Health Service to all osteopathic colleges constitute a challenge to every osteopathic institution to exceed the standard routines of institutional service.

★ ★ ★

Thorium dioxide (Thorotrast) presents an extremely difficult problem from the radiologic safety standpoint. It constitutes as serious a hazard as radium, because both are long-lived alpha-emitters. Thorotrast consists essentially of a 20 per cent solution of thorium dioxide. In the past, for liver and spleen visualization,

the usual dosage has been 75 cc. This is approximately equivalent to 1.5 micrograms of radium which is fifteen times the maximum allowable body radium content. The American College of Radiology has recently reported on Thorotrast as follows: "The use of thorium dioxide should be reserved for cases of extreme emergencies, where no other material would be satisfactory, or where life expectancy is considered to be short."

★ ★ ★

An analysis of 366 consecutive patients operated on for herniated disks from November, 1944, to July, 1950, will be found in the *American Journal of Surgery* for December, 1952. It was made by P. Ross and F. Jelsma. The report should be carefully studied from the standpoint of its discussion of the diagnosis and management of patients suspected of having herniated disks. The authors use complete roentgenologic studies in all cases of low-back pain, but employ myelography only in those cases in which a tumor is suspected. They state that the diagnosis of herniated disk should be made clinically. Generally, myelography is an undesirable and expensive procedure.

★ ★ ★

A survey of the literature before and after the introduction of mineral oil as an agent in the treatment of constipation appears in the November, 1952, issue of the *American Journal of Digestive Diseases.* The author, George L. Becker, makes a case against its use, quoting one of his references as stating, "It would be unfair to say that in some respects mineral oil has earned its niche in the section of toxicology rather than in pharmacology."

★ ★ ★

The Federal Trade Commission recently issued a desist order affecting a preparation known as "Celparux," containing parsley, celery, ascorbic acid, and 20 mg. of rutin. Importance of the decision lies in the ban on rutin, rather widely manufactured and used for the last 5 years. The Commission held that rutin itself presented no evidence of therapeutic value, even though frequently used by the medical profession.

★ ★ ★

The Food and Drug Administration convicted Arthur J. Cox of Indiana of making interstate shipments of improperly labeled medicine. Cox had a remedy for diabetes and cancer which consisted of a brew of mint leaves, boneset leaves and flowers, and sunflower and dogwood leaves. Twenty "living testimonials" were brought before the court in Cox's defense, but no scientific witnesses were produced.

★ ★ ★

Referred segmental pain originating somewhere between the ninth thoracic and the first lumbar spinal segments has been recently ascribed in a medical journal as a possible cause of recurrent abdominal pain not relieved by an appendectomy or subsequent exploratory operations for adhesions. The author, under the heading, "Abdominal Pain after an Appendectomy," attributes the cause to a postural defect, commonly a mild scoliosis. He calls attention to an inequality of leg length in such cases in which the left lower extremity is longer than the right, resulting in a convexity of the lumbar curve to the right. Equalization of the leg length by adding a lift to the short leg is recommended to relieve the symptoms. The closing statement of the "minor note" is, "I feel certain that many diagnoses of neurosis will be eliminated if the physician will consider the possibility of referred pain to the abdomen caused by minor skeletal defects of the spine."

★ ★ ★

An important manual for new hospitals and others forced to use inexperienced nursing supervisors has just been published by the Public Health Service and is entitled "The Head Nurse Looks at Her Job." Its purpose is to advise hospitals on finding ways to make more nursing care available to the public through the conservation and more effective use of scarce nursing skills. Write the Superintendent of Documents, Government Printing Office, Washington 25, D.C., and enclose 40 cents (no stamps).

★ ★ ★

Hospitals will find a loan of eight colored slides from the National Cancer Institute, Bethesda 14, Maryland, useful for teaching purposes. These slides depict how, when, and what mastectomy patients should be taught about breast prostheses. The problem of normal breast contour has undoubtedly caused many women to delay reporting a breast growth to their doctor, fearing breast removal with a resulting problem that seems insoluble to the patient.

★ ★ ★

Many factors are responsible for the gains in tuberculosis control. Isonicotinic acid hydrazides are proving helpful when used alone or in combination with other chemotherapeutic and antimicrobial agents, although authorities are cautious in their evaluation of these drugs. Mass x-ray surveys of adults, additional hospital beds for the tuberculous, and the supervision of such cases by physicians trained in chest diseases are important factors in control. Some specialists believe that the increased use of BCG vaccine may have more eventual significance in the final control of tuberculosis than other measures more popular in America.

★ ★ ★

BCG vaccine was discovered by two French scientists, Dr. Albert Calmette and Dr. Camille Guerin. It is created from tubercle bacilli taken from the milk of a tuberculous cow. The first significant vaccination program employing this biological was started in Sweden in 1929, according to Dr. Howard A. Rusk, associate editor of the *New York Times,* in a recent issue of that paper. Reports from Sweden, Norway, Denmark, and France, show a very marked decrease in mortality from tuberculosis. Programs in these countries are on an extensive scale. Use of BCG in the United States has been carefully controlled and has been largely confined to Indian reservations, where tuberculosis is still highly prevalent and the death rate

relatively high. Reports thus far are encouraging. Inoculations are given routinely to students in twenty-seven medical schools and forty-three schools of nursing. Tuberculosis has a high incidence among such students.

★ ★ ★

Annual x-ray examination of the lungs for all males over age 50 has the approval of the National Cancer Institute. Only in this way will widespread cure of lung cancer be possible through earlier diagnosis and treatment. Films made in three views (inspiration, expiration, and lateral) are much more informative than a single view.

★ ★ ★

The *British Medical Journal* for December 13, 1952, contained an article on the etiology of carcinoma of the lung, reporting the results of interviews with nearly 5,000 hospitalized patients. The study, which dealt with many comparisons between matched groups of patients, added emphasis to the growing body of information indicating that there is a direct relation between smoking and the occurrence of lung cancer. Estimated death rates in Greater London indicate the mortality from carcinoma of the lung may increase in approximately simple proportion with the amount smoked. Among men from 45 to 64 years of age the death rate in nonsmokers was negligible, while in the heavier smoking categories it was estimated to reach 3 to 5 deaths per annum per 1,000 living. Conclusion of the researchers: the association between smoking and carcinoma of the lung is real. This does not argue, however, that tobacco smoke contributes to the development of all cases of carcinoma of the lung.

★ ★ ★

Various American physical education cults have long stressed the importance of breathing exercises and of "deep breathing." In disciplined and philosophic terms controlled breathing enters into the religious practice of Hinduism, especially that of *hathayoga*, or bodily Yoga, which is Indian therapeutic technic for healing various bodily ills. But modern science has had nothing to do with the entirely intuitively conceived abstractions of the East, even though such abstractions might be operational in daily living, in a field as practical as that of medicine.

Since 1910 medical training has been increasingly based on the physical and biologic sciences with a meticulous avoidance of any practice which might be termed "unscientific" or "unorthodox." As a result, a considerable body of age-old wisdom relating to the healing arts has been by-passed by allopathic medicine until a scientific foundation has been achieved.

That the newly created physical medicine may open the door to hitherto "unorthodox" practices is suggested by the appearance of an article on "The Therapeutic Basis of Breathing Exercises" in the January, 1953, issue of the *Cleveland Clinic Quarterly*. An article with such a title on such a subject carries a significance, therefore, over and above its recital of the technics of breathing exercises and their relation to the treatment of rheumatoid spondylitis and asthma and the preoperative and postoperative management of patients who are to have thoracic surgery. Physical medicine has long been one phase of osteopathic medicine and by virtue of its emphasis may lead to a consideration of man the unit, a consideration that is basic to osteopathic medicine.

The same issue of the *Quarterly* has an article that will appeal to those doctors who are interested in the physician throughout the ages. The tradition of St. Luke, the physician, is a part of our Hebraic-Christian heritage, yet the knowledge of the average reader about Luke the physician goes little beyond that of the bare fact that such a tradition exists. "St. Luke, the Physician," by A. C. Corcoran, M.D., is a slight sketch of four pages in which the author has utilized the narrative as given in the Gospel and the Acts of the Apostles, supplemented it with the known of contemporary history, and woven them together to make the point that Luke, "was one of us." It is a convincing and delightful little story, with "some guessing and a measure of presumption," yes, but doubtless as valid as most of our historical postulations. Medicine has continuity, but it does not rest upon organization nor monopoly.

★ ★ ★

*In Brief.* The Bureau of Medicine and Surgery's training film, "Sciatic Pain and the Intervertebral Disc," is reported in the United States Navy *Medical News Letter* as the most popular film presented at the December 2-5 Denver Session of the American Medical Association. . . . Irradiation of recurrent and metastatic breast carcinoma is, in general, more effective than the primary use of the steroids for premenopausal women. The use of androgenic steroids for premenopausal patients should be be reserved for those with involvement too widespread for roentgen therapy and for radioresistant processes according to I. MacDonald, F. E. Davis, and G. Jacbson writing in *American Journal of Roentgenology*, December, 1952. . . . *Industrial Medicine*, December, 1952, reports trauma occurring in industrial workers is a common cause of the clinical onset of previously quiescent peritendinitis and bursitis of the shoulder. . . . Successful reduction of acute sigmoidal volvulus by means of a rectal tube inserted through a sigmoidoscope is reported in ten out of eleven cases at the Massachusetts General Hospital. The technic is described in the November 27, 1952, issue of the *New England Journal of Medicine*. . . . *Geriatrics* for November-December, 1952, emphasizes the necessity for conservative exhibition of drugs, particularly sedatives, in elderly people. . . . The more common fatal complications of portal hypertension, esophageal varices, melena, and ascites, can now be controlled by direct surgical attack in which it has been found possible to shunt the portal flow directly into the systemic venous circulation by either a portacaval or splenorenal anastomosis, thus reducing the blood flow through the collateral venous channels in the esophagus and at the same time lowering the portal venous pressure. The problem is given detailed consideration in the *Journal of the International College of Surgeons* for November, 1952.

SPECIAL ARTICLE

# Physics of the Intervertebral Disk

## Part II*

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### 6. INTRODUCTION TO PART II

**6.1.** This is Part II* of a report of a research study on the physics of the intervertebral disk, constituting the first stage of a project to study the mechanics of the human spine strictly from the standpoint of physics and mechanical engineering. The project is sponsored by the Osteopathic Hospital and Clinic of New York who have retained Paul Rosenberg Associates, a firm of consulting physicists, for the research study.

**6.2.** The general purpose of this research project and the viewpoint adopted in this study are explained in Section 1 of Part I.† Attention is called also to the definitions given in Section 2 and to the comments in paragraph 1.6.

### 7. RELATION BETWEEN MOTION OF THE NUCLEUS PULPOSUS AND SPRAIN OF THE EXTENSOR MUSCLES OF THE BACK

**7.1.** The forces of thrust between adjacent vertebrae are transmitted almost entirely through the intervertebral disk, as shown in paragraphs 3.2. through 3.7. These forces of thrust are borne almost entirely by the nucleus pulposus, as shown in Section 5. Furthermore, the nucleus pulposus changes its position within the intervertebral disk as the adjacent bodies change their tilt with respect to each other, in the manner discussed in Section 5. We shall now apply these three results to analyze the case of a normal subject endeavoring to extend his spine backward against external opposing forces.

**7.2.** One case of this is a man standing with his legs fully extended and with his trunk and spine flexed far forward, trying to lift a weight off the floor in front of him. (This situation is shown in Figure 5, Part I.) Figure 10a diagrams two adjacent vertebrae and their included intervertebral disk in sagittal section for this case.

**7.3.** By contrast, consider the case of the same man lifting the same weight with his trunk and spine erect; or, better still, consider the man sitting in a rowboat with his trunk and spine extended backward, pulling horizontally backward on a pair of oars. Figure 10b diagrams the two adjacent vertebrae and their included disk for this case.

**7.4.** In both cases, the following two sets of forces act between the vertebrae to extend the spine, or to oppose flexion: first, the forces of thrust, F and F′, Figure 10, transmitted from body to body through the nucleus pulposus; second, the forces of tension exerted by the muscles and ligaments of the back upon all those portions of the vertebrae lying posterior to the nucleus. The line of action of the resultant, P and P′, Figure 10, of these forces of tension must lie somewhere between the posterior surface of the vertebral body and the posterior extremity of the spinous process. One of the features of the analysis here presented is that it is not necessary to determine the position of P and P′ any more exactly than in the foregoing statement. The particular positions of P and P′ in Figure 10 are chosen for illustrative purposes only.

**7.5.** The effectiveness of the forces P and P′ in resisting flexion and producing extension is determined by the moments of these forces with respect to the center of the nucleus pulposus taken as an axis. The moments of P and P′ with respect to the nucleus are, respectively, the products Pp and P′p′, where p and p′ are the distances from the nucleus to the lines of action of P and P′ respectively (Fig. 10).

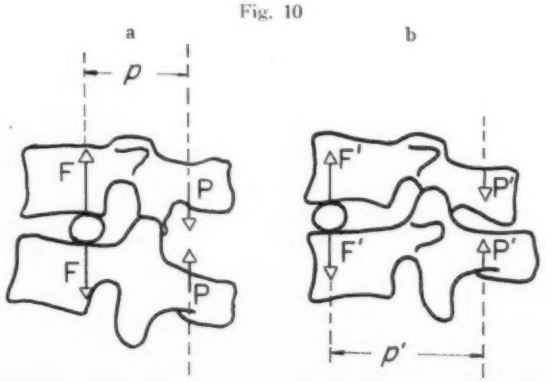
**7.6.** In order to have the same effectiveness in the two cases (7.2. and 7.3.),

$$Pp = P'p'$$

But p′ is greater than p because of the motion of the nucleus in extension and flexion. (See Section 5.) Therefore, P must be greater than P′.

**7.7.** This means that, as we consider successive positions of the spine from full extension to full flexion, there is a monotonic increase in the

Fig. 10

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*Part I was published in THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION 52:326-334, February, 1953.

†All sections and paragraphs in both parts are numbered in sequence to facilitate reference. Part I contains paragraphs 1.1. through 5.20. Part II contains paragraphs 6.1. through 10.2.

magnitude of the forces which the musculature and ligaments of the back are called upon to exert in order to produce the same effectiveness of extensor force.

**7.8.** Another way of describing the same conclusion mechanically is to say that the motion of the nucleus pulposus changes the "mechanical advantage" which the back muscles and ligaments have over the forces (external and internal to the individual's body) tending to flex the spine forward. This mechanical advantage will increase as the spine extends and the nucleus moves forward; the mechanical advantage will decrease as the spine flexes forward and the nucleus moves backward. A simpler, although less precise way of saying the same thing is that the spine and its attached back muscles and ligaments are better able to exert forces of backward extension when the spine is extended than when it is flexed forward, because of the motion of the nucleus.

**7.9.** As a direct corollary of the foregoing, we conclude further that, as a result of the normal motion of the nucleus pulposus, the muscles and ligaments of the back are more disposed to be *sprained* when the spine is in a position of forward flexion than is the case when the spine is upright or in a position of backward extension. (Needless to say, the motion of the nucleus pulposus may not be the only reason why sprain of the back muscles and ligaments is most likely to occur in the position of forward flexion. The analysis presented above reveals only that the motion of the nucleus is *one* such reason.)

**7.10.** It will be noted that the foregoing discussion (paragraphs 7.1. through 7.9.) dealt only with the extensor muscle system. It is logical to inquire if the motion of the nucleus pulposus has the same relation to the flexor and lateral systems of muscles as we have just found for the extensor system. The answer is that the same relation does indeed apply to the flexor and lateral systems of muscles, but the effect upon these systems is so small as to be entirely negligible. The reason is that the total excursion of the nucleus pulposus, even in the most extreme flexion and lateral bending, is still small compared to the effective moment arms of the muscles causing flexion and lateral bending. In other words, the "s" (Figs. 2, 3, 4) of the flexor and lateral muscle systems is so large to start with, that only a small percentage change in s is produced when the nucleus moves. The effects revealed and analyzed in paragraphs 7.1. through 7.9. are partly a consequence of the fact that the extensor muscle system of the spine is situated close to the intervertebral disk and the nucleus pulposus.

**7.11.a.** From the equations in Section 3, and from paragraph 7.6., it is obvious that F is greater than F′ in Figure 10 when P is greater than P′. F increases as p decreases. In other words, when the spine is in flexion the rower or the weight lifter (paragraph 7.3.) must exert greater force and pressure upon the nucleus pulposus than is the case when the spine is in extension.

**b.** Therefore, as far as the magnitude of the *pressure* is concerned, herniation of the nucleus pulposus (or of the disk) is more likely to occur when the spine is in flexion than when it is in extension.

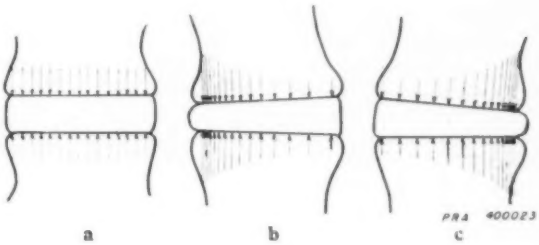


Fig. 11

This statement applies to herniation into the spongiosa of the vertebral bodies as well as to posterior herniation into or through the posterior longitudinal ligament.

8. PROLAPSE OF THE DISK INTO SPONGIOSA

**8.1.a.** As a further illustration of the application of the analyses of Sections 3, 4, and 5, we now consider in further detail the mechanical reasons for prolapse of the intervertebral disk into the spongiosa of the vertebral bodies.

**b.** The primary reason is the high concentration of force, i.e., the high pressure, existing between the nucleus pulposus and the vertebral body. Practically all the forces of thrust between adjacent vertebrae are concentrated in the nucleus. The calculations in 3.17.b. show that this pressure can become as high as 168 atmospheres!

**c.** Needless to say, there must be present also a mechanical weakness or fault in the cartilaginous plate, or the spongiosa, or both, such that these structures cannot withstand the pressure.

**8.2.** Why does not the nucleus itself become mechanically "crushed" without damage to the cartilaginous plate, the spongiosa, or the annulus? The reason is that the nucleus has no structure or shape of its own to maintain. *The nucleus serves only to distribute pressure. Mechanically speaking, there is no "damage" which the nucleus can suffer because it is practically incompressible at the greatest pressures which can be produced by the intervertebral bodies.*

**8.3.a.** It is instructive to consider what would be the case if the disk were constructed simply of a homogeneous elastic material, such as rubber, with elastic coefficients, or "stiffness," sufficient to cope with the forces between the vertebral bodies.[3]

**b.** There would be one position, call it the "neutral" position, in which the compressive forces would be uniformly distributed over the bodies of the vertebrae (Fig. 11a). However, when the bodies tilted with respect to each other there would result a concentration of force, i.e., an increase in pressure at the sides where the vertebrae were approximated (Figs. 11b and 11c).

**c.** Every motion of the spine would change the distribution of pressure on the vertebral bodies and shift the position of the resultant force vector on each vertebral body. The result would be more frequent mechanical failure of the vertebral body. Another more certain result would be that the spinal column would be in "repose" only in one position or shape because each disk would have its own preferred or "neutral" position. This hypothetical disk which we are momentarily considering would give the spine far less flexibility than it actually has.

**8.4.a.** Among other things, the foregoing analysis explains why the prolapse of nuclear tissue into the spongiosa is not necessarily or usually accompanied by extensive fracture of the end surface of the vertebral body. As soon as a small fault or fissure occurs in the cartilage plate, or in the end surface of the body, or in both, the relatively fluid nucleus is forced through this fissure by the tremendous pressures to which the nucleus is normally subjected. The escape of some of the nuclear material through this fissure immediately relieves the pressure and prevents further fracture of the end surface of the vertebral body.

**b.** However, in the case of sudden severe trauma, there is not sufficient time for the pressure of the nucleus to be relieved by the relatively slow escape of nuclear tissue through a small fissure. Under such circumstances the sudden application of tremendous pressure results in a compression fracture of the end surface of the vertebral body.[2]

## 9. POSTERIOR HERNIATION OF THE DISK AND THE NUCLEUS

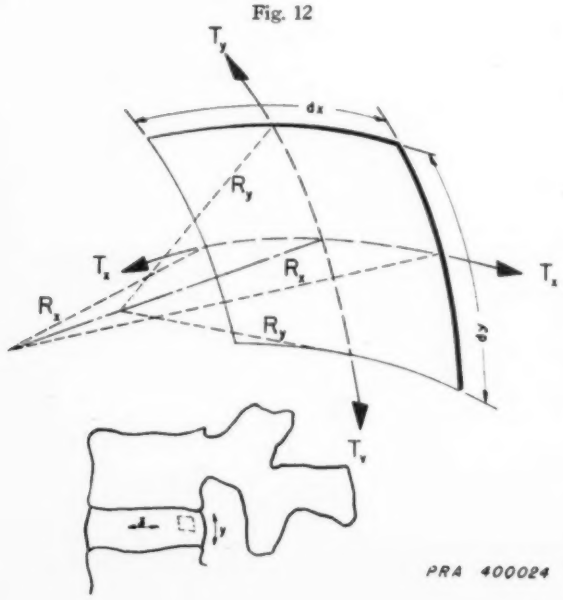
**9.1.** This section presents an analysis of the mechanical causes of posterior herniation of the intervertebral disk, and the mechanical conditions predisposing toward this condition.

**9.2.a.** The forces the nucleus can exert through elasticity of shape (paragraph 5.2.a.) are small compared to the stresses to which the nucleus is subjected (paragraph 3.17.b.). The nucleus behaves, to all intents and purposes, as a fluid (paragraph 2.6.).

**b.** Consequently a herniation of the nucleus or of the disk cannot be ascribed to any weakness, structural fault, or damage in the nucleus itself. This statement applies to the herniations discussed in Section 8 as well as to the herniations now being discussed in Section 9.

**c.** Posterior herniation of the disk must be due to a mechanical fault, trauma, degeneration, or other damage to the annulus fibrosus or to the ligamentous structure posterior to the disk.

Fig. 12




**9.3.a.** Consider the annulus fibrosus together with its attached ligamenture as a capsule[3] enclosing the nucleus. Let us analyze this capsule as an elastic membrane enclosing an incompressible fluid (the nucleus). Let Q be the difference in pressure between the fluid inside and outside the membrane.

**b.** Referring to Figure 12, let dx dy be a differential element of area of the elastic membrane. Let $T_x$ be the tension (force across line of unit length) corresponding to the x direction and let $T_y$ be the tension corresponding to the y direction. Let $R_x$ be the radius of curvature of the membrane at the center of the element of area, in the x direction; and let $R_y$ be the corresponding radius of curvature in the y direction.

**9.4.** The element of area dx dy is in equilibrium under the action of the forces of tension $T_x$, $T_y$, and the forces of the pressure Q. Resolving these forces along the normal to the elemental area at its center, we have:

$$Q\,dx\,dy = 2T_x dy \sin\frac{d\theta_x}{2} + 2T_y\,dx \sin\frac{d\theta_y}{2}$$

$$\text{where } d\theta_x = \frac{dx}{R_x}$$

$$d\theta_y = \frac{dy}{R_y}$$

**9.5.a.** The sines may be replaced by the angles themselves because the angles are small. We then have:

$$Q = \frac{T_x}{R_x} + \frac{T_y}{R_y}$$

**b.** In the limiting case of a spherical membrane,

$$R_x = R_y = R$$

and

$$T_x = T_y = T.$$

We then have the simple relation

$$Q = 2T/R.$$

**9.6.a.** Applying the equation of paragraph 9.5.a. to the posterior part of the annulus and the posterior longitudinal ligament, Q is the pressure in the nucleus; $R_x$ is the radius of curvature in a plane passing "horizontally" through the middle of the disk, parallel to the end surfaces of the bodies of the vertebrae; $R_y$ is the radius of curvature in a sagittal plane; $T_x$ and $T_y$ are the corresponding tensions.

**b.** Any given amount of movement, anteriorly-posteriorly, of the posterior part of the capsule will produce much more change in $R_y$ than in $R_x$; because the ends of the vertebral bodies, to which the capsule is attached in the y direction, are relatively close together, thus confining the capsule to a short arc in this direction. The corresponding change in $R_x$ is small because the capsule sweeps round in a long arc in the x direction.

**c.** Let us therefore examine the changes in $T_y$, $R_y$, which are greater than the changes in $T_x$, $R_x$. $T_y$ and $R_y$ are more pertinent to posterior herniation than $T_x$ and $R_x$.

**9.7.a.** In Figure 13 a series of circular arcs represent the membrane in sagittal section (in the y plane), each arc terminating at the edges of the vertebral bodies where the membrane is considered

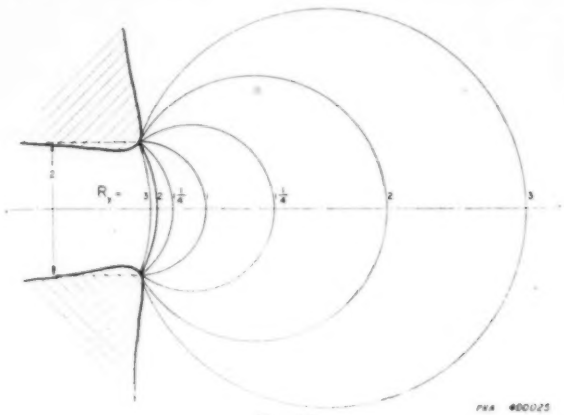


Fig. 13

to be attached. The numbers inside each arc give the relative values of the radii of curvature. Unity in Figure 13 corresponds to half the distance between the two points of attachment.

**b.** Consider the membrane initially in the shape of the shortest arc 3 at the left of the diagram. If the pressure Q is increased, the membrane accommodates itself by expanding to a longer arc with a smaller radius of curvature, for example to the adjacent arc 2.

**c.** Note that the radii of curvature, 3, 2, 1¼, 1, become smaller as the arcs lengthen to accommodate more fluid at greater pressure Q. From Equation 9.5.a., these decreasing radii permit the same tension to withstand the increased pressure; this is a condition of stable equilibrium.

**9.8.a.** However, the equilibrium is unstable after the radius of curvature reaches its minimum value, which is unity. For all arcs to the right of the unity arc in Figure 13, an increase in the length of the arc corresponds to an increase in radius of curvature. As the membrane expands, it becomes less able to withstand the pressure for a given tension because the radius of curvature is increasing.

**b.** As Q and $R_y$ continue to increase, $T_y$ finally becomes greater than the breaking strength of the membrane; the membrane ruptures, resulting in posterior herniation of the intervertebral disk.

**9.9.a.** The analysis in paragraphs 9.7.a. through 9.8.b. leads to the following surprising result: If the annulus and the posterior longitudinal ligament do not contract elastically when the posterior ends of the vertebral bodies approximate, then a position of extreme extension, rather than flexion, is conducive to posterior herniation of the intervertebral disk.

**b.** The reasoning that leads to the foregoing statement is this. Assume that the annulus and the posterior longitudinal ligament have some minimum length in the y direction to which they will contract when not subject to external stresses, and assume this minimum length is greater than $\pi/2$ multiplied by the distance between the posterior edges of the vertebral bodies in extreme extension. Alternatively, assume that the elastic coefficients of the annulus and ligament are such as to leave them under negligibly small tension when the posterior edges of the bodies approximate each other in extreme extension. In either case the annulus and ligament fall into the family of arcs to the right of the unity arc in Figure 13, namely, into the unstable situation described in paragraphs 9.8.a. and 9.8.b.; posterior herniation of the disk can occur readily in this position.

**c.** The type of herniation described in 9.9.a. and 9.9.b. can result from a prior degeneration of the annulus, or of the ligaments, or of both. On the other hand, from a mechanical point of view, this type of herniation may occur also in a healthy subject with no prior degeneration if, normally, the annulus and posterior ligaments do not contract enough to maintain their tension when the posterior ends of the vertebral bodies are in close approximation.

**9.10.a.** The statement in paragraph 9.9.a. does not contradict 7.11.b. The position of flexion is conducive to herniation as far as the magnitude of the *pressure* on the nucleus is concerned; the position of extension is conducive to posterior herniation as far as the *elastic properties* of the annulus fibrosus and the posterior longitudinal ligament are concerned.

**b.** Indeed, these two effects are mutually reciprocal, so to speak, in the following way: when the spine is in flexion, the pressure on the nucleus is greater than in extension, but the posterior portion of the annulus is better able to withstand this greater pressure; conversely, when the spine is in extreme extension, the posterior portion of the annulus can be ruptured more readily by the pressure of the nucleus, but this pressure is fortunately lower than in flexion.

**9.11.a.** Assume now that the mobility of the nucleus pulposus is impaired by some abnormality, degeneration, or pathologic condition, such that the nucleus becomes lodged in the posterior part of the intervertebral disk; or assume that the motion of the nucleus, normally rapid, becomes sluggish so that it remains in the posterior part of the disk momentarily when the spine is extended. Under these circumstances the pressure in the nucleus will be abnormally high when the subject exerts himself to extend the spine.

**b.** If the condition described in 9.11.a. is combined with insufficient elasticity of the posterior part of the annulus fibrosus (and posterior longitudinal ligament) as described in 9.9.b., then extreme extension is the position of the spine most conducive to posterior herniation of the nucleus.

## 10. SUMMARY

**10.1.** The first stage of a research project has been completed to study the mechanics of the human spine, strictly from the viewpoint of physics and engineering mechanics. The study uses the explicit definitions, unambiguous terminology, and rigorous logic of physics. The result is to correct many concepts and clarify much of the thinking concerning spinal mechanics.

**10.2.** Some of the specific results obtained to date are: mechanical analysis of the properties, behavior, and interrelation of the intervertebral disk, nucleus pulposus, annulus fibrosus, and the vertebral bodies; mechanical analysis of prolapse of the nucleus pulposus into the spongiosa of the vertebral bodies; mechanical analysis of posterior

herniation of the disk and the nucleus, and analysis of the mechanical conditions predisposing toward herniation; and mechanical analysis of the cause of sprain of the muscles of the back.

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3. *Ibid*, p. 13.

## SCOLIOSIS—STRACHAN

*(Continued from page 378.)*

point. The upper half of the upper curve and the lower half of the lower curve are treated separately, with care being taken to protect previously treated areas.

It is advantageous whenever possible in the manipulative treatment of scoliosis to include an element of traction. The amount should be moderate because excessive traction force will splint the area and interfere with the action of the other simultaneously applied forces.

Scoliosis is a succession of compensatory changes. It should be pointed out that the deformity is itself a compensation for some factor which disturbs equilibrium. The somatic tissues of the scoliotic area exhibit compensatory changes which at first are functional and later may become organic in nature. Distant parts of the body, including the viscera, adapt themselves to the presence of the deformity. There may be a necessity for the individual to choose or change his occupation in keeping with his limitation of physical activity. Furthermore, the scoliotic person may have to work out his own psychologic compensation for his physical handicap.

No attempt has been made in this paper to evaluate congenital anomalies, disease processes, unequal leg length, or other known causes of scoliosis. The purpose of this paper has been to make some practical suggestions for management, based on an evaluation of compensatory factors, and the possibility that the osteopathic spinal lesion may be the "X factor" in the etiology of scoliosis.

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# Department of Public Affairs

DONALD M. DONISTHORPE, D.O.
Chairman
Los Angeles

## BUREAU OF PUBLIC EDUCATION ON HEALTH

HOBERT C. MOORE, D.O.
Chairman
Bay City, Mich.

### HEALTH BILLS INTRODUCED IN LEGISLATURES

With some forty-four legislatures holding general or special sessions this year, important proposed health bills have been introduced for the consideration of the legislators. Most of the legislative sessions will last until April or May; therefore, it is difficult to estimate at this early date the number of public health bills which will be enacted into law. Bills having as their purpose the amendment or revision of the practice acts regulating osteopathic practice have been introduced in Georgia, Idaho, Illinois, Minnesota, Montana, New Mexico, Oregon, Texas, and West Virginia. In the case of the bills introduced in Georgia, Idaho, Illinois, and Minnesota, the purposes of the proposed legislation are to increase the scope of osteopathic practice rights. In Montana, the bill will raise the educational standards for licensure to be more consistent with present day osteopathic educational standards. In New Mexico, Oregon, and Texas, the proposed amendments pertain to administrative and procedural provisions. The West Virginia bill would merely clarify the present law which while clearly granting unlimited practice rights has been the subject of recent litigation.

Proposed legislation pertaining to other fields of health affairs has been introduced in many states. Of particular interest are the proposals to permit employees covered under state Workmen's Compensation Acts to select the physician to care for them in case of injuries or illness suffered in the course of employment. Only the laws of a few states today permit the injured employee to choose the physician, it being the usual provision of compensation laws that the employer shall furnish medical and surgical care and that the employee may only select the physician in case of emergency or of a failure of the employer to provide care.

The bills indicate a continued interest in the enactment of the medical examiner system to replace the coroner system. In some states the coroner's office is created by the constitution, and in such states a constitutional amendment must be proposed to change the present system. Osteopathic physicians serve as coroners in many areas of the country and also in some areas where the medical examiner system has been established are eligible to serve as medical examiners. The office of coroner has long been a part of American government and in some states there is a great reluctance to abolish such a traditional office. In other areas, it is recognized that minor changes in the coroner system will serve the same purpose as the establishment of a completely new medical examiner system and without the expenses involved in the creation of a new state-wide system. Each state, it would appear, finds its problem different and thus adopts the procedure which will most effectively and efficiently handle its situation.

In several states, bills have been introduced to concentrate greater authority in the state boards of health or the state health officers. Advisory committees, it is proposed, will become only consultation committees devoid of any supervisory authority. It is also proposed in one state to make the state health officer a member of the medical licensing board, to serve as its secretary as is the case in some states at the present time. The experiences of the osteopathic profession with state health officers or boards of health vary. All state health officers are doctors of medicine, but doctors of osteopathy serve as members of the boards of health in eight states.

In other areas, osteopathic physicians serve upon advisory committees to the state health officer or board. The health affairs of a state are a subject of broad interest and many healing arts professions and other health or technical groups have a heavy responsibility in them. Continued progress in raising the health standards can be achieved only by the combined efforts of all these professions and groups. No one organization has an interest to the exclusion of the others. It is in the states where all the professions and groups work toward the common goal that the greatest strides have been made. Proposed public health bills should be enacted with these principles in mind.

The right to the use of public tax constructed or supported hospitals is a subject of many bills. The exclusion of patients of some physicians from public hospitals while permitting others the full use of such institutions is apparently still a matter of serious concern. No other governmental institutions are subject to such an arbitrary grant of use privileges. All the people whether they are permitted the privilege of being cared for in the public hospital or not are taxed for its support. No exemption from taxation is given the excluded citizens. In one state, a bill has been introduced providing that in every public hospital ". . . every patient . . . shall have the free choice and right to select, be attended and receive treatment and other professional services from any duly licensed physician or practitioners of the healing arts he may choose. . . " In few fields of governmental operation has it been necessary for legislatures to state so explicitly what would appear to be no more than the democratic right of every person.

# Osteopathic Foundation

LEWIS F. CHAPMAN
Director
Chicago

## COMMITTEE ON CHRISTMAS SEALS

STEPHEN M. PUGH, D.O.
1952 Campaign Chairman
Everett, Wash.

### 1952 CHRISTMAS SEAL CAMPAIGN

Here, in chart form, is the twenty-second chapter in the year-to-year story of the osteopathic Christmas seal campaign. Like its predecessors, it tells a story of growth and promise, brought home by these statistical highlights:

The 1952 seal campaign, like the twenty-one preceding it, tops previous records. So far, it has brought in more than $23,000—114 times as much as was brought in by the first campaign in 1931, close to double the proceeds of 1949—the first year proceeds were shared by the research fund—and $4,000 over a comparable total of 1951.

The 1952 campaign proves the effectiveness of the Packet Plan, by which doctors and auxiliary members distribute seals to the osteopathic public. The plan was first tried last year and produced $3,700.00. This year it produced $7,500.00, more than double. The Auxiliary raised its Packet returns by 50 per cent.

The 1952 campaign saw significant group activity, led by the Sedgwick County Osteopathic Society of Kansas and the Philadelphia College Student Wives group.

This year's results give outstanding evidence of growth. The increased interest is both evidence and promise. The campaign is far from its potential effectiveness, but every year it gets farther along the way.

REPORT OF THE 1952 CHRISTMAS SEAL CAMPAIGN
As of February 20, 1953

| Contributors | Number | Returns | | | | Total |
|---|---|---|---|---|---|---|
| | | From the Profession | | From the Auxiliary | From the Public | |
| Individual doctors: | | | | | | |
| Contributors | 2,075 | $10,280.00 | | | | |
| Distributors* | 168 | | | | $6,569.80 | |
| | | | | | | $16,849.80 |
| Hospitals | 58 | 451.00 | | | | 451.00 |
| Colleges: | | | | | | |
| 1) Campus campaigns | 6 | 1) | | | | |
| 2) Parents of students | 532 | | | 2) | | |
| CCO | | 97.00 | | 200.60 | | |
| COPS | | 299.44 | | 308.60 | | |
| DMS | | 207.25 | | 237.90 | | |
| KC | | 297.50 | | 65.40 | | |
| KCOS | | 31.50 | | 375.00 | | |
| PCO | | 166.75 | | 359.50 | | |
| | | | 1,099.44 | | 1,547.00 | 2,646.44 |
| Auxiliary | | | | | | |
| Individual members: | | | | | | |
| Contributors | 715 | | | 1,838.00 | | |
| Distributors* | 21 | | | | 219.00 | |
| Groups: | | | | | | |
| Contributors | 12 | | | 60.30 | | |
| Distributors* | 13 | | | | 693.75 | 2,811.05 |
| Miscellaneous | | | | | | |
| Public gifts | 40 | | | | 284.36 | 284.36 |
| Seal collectors | 45 | | | | 64.01 | 64.01 |
| Total | | $11,830.44 | | $1,898.30 | $9,377.92 | $23,106.66 |

*Persons who distributed Christmas seal packets to patients and friends.

# Department of Public Relations

CHESTER D. SWOPE, D.O.
Chairman
Washington, D. C.

## VA HOME-TOWN MEDICAL CARE

The following is excerpted from the Annual Report of the Administrator of Veterans Affairs for the Fiscal Year ending June 30, 1952:

The expanded home-town medical-care program, in operation since 1946, has provided medical care for eligible veterans who could not be treated conveniently at VA clinics. This program has saved veterans many hours they would otherwise have been required to use in traveling to and from VA clinics, some of which would have been lost from their work. The convenience of treatment in their own home towns, together with the privilege of being treated by doctors of their own choice, has made this plan highly acceptable to veteran-patients. Approximately 107,000 doctors of medicine and 7,000 doctors of osteopathy throughout the United States and Territories indicated their availability for participation in the home-town medical-care program during fiscal year 1952.

At the end of the year, medical care was contracted for in 38 States and Territories. In 23 of these States and Territories, direct agreements between the Veterans Administration and State medical societies governed fee payments to participating physicians; in 14 States and Hawaii the plan was operating through intermediary organizations recommended and approved by the State medical societies. Even though a State agreement is in force in the State which the veteran lives, he may select any reputable physician for his treatment. The physician need not be a member of the State medical society, but must be licensed in the State to practice medicine and be in good standing in his community.

In addition to the home-town medical-care program, a home-town dental-care program was in effect in all States and Territories of the United States during fiscal year 1952. The consultant program for outpatient dental activities was expanded in order to insure the continuance and improvement in the high type of dental care now provided for veterans.

Agreements were in effect in 29 States for home-town osteopathic services. Although no agreements were in effect in the remaining States (and in the District of Columbia), fee-basis osteopathic physicians were used in these States for the treatment of entitled veterans under direct supervision of VA offices.

A home-town pharmacy program was in operation in 45 States, the District of Columbia, and Hawaii.

## GI INTERNS AND RESIDENTS

American Osteopathic Association approved internships and residencies are institutional courses and entitled to full GI allowances (single, $110.00 per month; one dependent, $135.00 per month; more than one dependent, $160.00 per month), within the meaning of regulations issued effective January 22, 1953, pursuant to the Veterans Readjustment Assistance Act of 1952.

# Current Medical Literature

## A REAPPRAISAL OF ABSORBABLE GLOVE POWDER

During recent years, powder derived from corn starch has gradually replaced talcum powder as a surgical glove lubricant to the extent that starch powder is now used in 60 to 90 per cent of the hospitals in the United States, but the powder is erroneously considered perfectly safe and foolproof by many users. C. Marshall Lee, Jr., M.D., and his coworkers present results of further experimental study of the effects of absorbable glove powder in *Surgery, Gynecology and Obstetrics,* December, 1952.

Glove powders contaminating a wound during surgery produce adhesions on serosal surfaces and granulomas in the soft tissues as the result of foreign body reaction. When these conditions are produced by talcum powder, they are essentially irreversible and permanent, as talc crystals are insoluble and nonabsorbable. But because it is chemically inert and readily absorbable, the starch powder has been found much superior to and less hazardous than talcum. It produces a much less violent reaction and, provided no infection is present, is eventually absorbed, leaving serosal surfaces and tissues unharmed. But during absorption, the starch granules remain foreign bodies and precipitate a typical reaction which progressively diminishes until the granules are completely absorbed. Furthermore, in the presence of complicating factors such as infection, the process is much more violent and an increased amount of permanent scar tissue is formed.

Objectives of the present study were to compare tissue tolerance toward two identical starch powders in which 2 per cent magnesium oxide and 3 per cent magnesium carbonate, respectively, were added to keep the powder as finely dispersed as possible, and to determine the extent and degree of reaction which takes place during the 6 to 25 days required for complete absorption of the starch powder.

A total of 100 dogs were used in the experiment. The procedure consisted of opening the abdomen and exposing the small bowel and mesentery, upon which approximately ½ teaspoon of the starch powder was dusted. An attempt was made to distribute the powder as evenly as possible, but many clumps were formed. In control animals the same procedure was followed, eliminating the powder. Twenty animals were invalidated for various reasons. After intervals of 1 to 25 days, the remaining 80 animals were reoperated upon and the adhesions were counted. Even with the relatively large amounts of powder used, adhesion formation was not extensive, regardless of the dispersal agent used. A wide range in the number of adhesions reflected variables such as subclinical infection, health of the animal, uneven application of the powder, et cetera, and this factor was especially important as several of the control dogs also developed adhesions. In general where the powder had been finely dispersed into individual granules, it was well tolerated and quickly and harmlessly absorbed. At both 18 and 25 days after the initial operation most of the animals showed no adhesions and those seen were located where large clumps of the powder had fallen. There appeared to be no significant difference in the reaction of the peritoneum to powder containing 2 per cent magnesium oxide or 3 per cent magnesium carbonate.

The authors point out that in clinical practice, the bowel would not be likely to be dusted with the quantity of starch powder used experimentally, even if a glove were accidentally torn. The fact that even under the experimental conditions reaction was relatively slight, indicates that starch powder is desirable as a glove lubricant. However, regardless of how harmless the powder might be, its presence in a wound produces some degree of foreign body reaction and all precautions must be maintained to prevent wound contamination.

## SURGERY IN PREMATURE BABIES

Surgical treatment of the premature baby requires great care, delicate handling, and special operative technics, because of the physiologic limitations imposed upon the newborn infant as a result of its prematurity. The principles of therapy and care observed in surgical treatment of 159 premature infants over a period of 16 years are discussed by Robert E. Gross, M.D., and Colin C. Ferguson, M.D., in *Surgery, Gynecology and Obstetrics,* November, 1952.

In the premature child, body heat production is low because the ratio of body surface to body weight is much greater than that of the full-term baby, and thus is less adequately protected by subcutaneous fat. Vasomotor control is lacking and sweating and shivering are inadequate. Respiration requires much greater effort for the premature baby, leaving little or no respiratory reserve.

In relation to the full-term infant, pulse rate is higher, blood pressure, erythrocyte count, and hemoglobin levels lower, but cardiac output required is much greater than normal, thus depleting the cardiac reserve to the point where the premature infant is very susceptible to alteration of blood volume. Low plasma protein level facilitates edema, and low globulin level, coupled with low leukocyte count, presents little resistance to infection.

Since the gastrointestinal tract is incompletely developed, bowel distention is an ever-present possibility. Vitamin and mineral reserves of the newborn are usually adequate, but administration of vitamin C insures complete metabolism of certain amino acids in premature infants. The kidneys are not mature as shown by limited power of urinary concentration; low clearance levels of urea, sodium, and chloride; and by frequent albuminuria.

In preparation for surgery, premature infants should be kept in or transported to the hospital in incubators which can be maintained at constant temperature and into which oxygen may be introduced. Other aids to respiration include removal of tracheal mucus and administration of whole blood, to increase the oxygen-carrying capacity of the blood. A nebulizer which creates a moist atmosphere within the incubator is beneficial when tracheal obstruction is present.

The less the premature infant is handled, the better. Necessary ministrations are kept at a minimum, and no clothing is put on the baby; diapers are simply placed under the buttocks.

Preoperative medication includes vitamin K given before and after operation, penicillin administered as a prophylactic, and approximately an hour prior to operation, .065 mg. of atropine. A warmed bassinette covered by a plexiglass dome is used to carry the infant to the operating room, with a continuous supply of oxygen from a portable tank. On the operating table, hot water bottles and cotton sheet wadding preserve body heat. Since most premature babies require blood during operation, an ankle or arm vein is prepared.

General anesthesia has proved safe and satisfactory. Cyclopropane is usually the anesthetic of choice, because of easy induction, good relaxation, and rapid recovery. Intratracheal intubation is contraindicated except in emergency.

The surgeon must work swiftly, using the simplest procedure possible, without sacrificing good technic. No. 00000 silk sutures on atraumatic needles or catgut of minimum size, No. 00000 chromic, with swaged-on needles is recommended. Tissues must be handled gently and fine interrupted silk sutures employed for closing incisions. When applied loosely, dressings present no danger, but adhesive stretched over the chest or abdomen of the infant may seriously inhibit respiration. Elastoplast is suggested as an adequate covering for bandages as it stretches readily.

Laboratory hematologic or biochemical studies are contraindicated except in extreme cases, not only because of the difficulty of withdrawing blood, but also because the premature infant's condition may change so rapidly that results are not valid. The attending doctor must rely on his clinical judgment.

Since the infant is susceptible to overhydration, parenteral fluids administered should be limited to 30 cc. per pound of body weight every 24 hours for 4 or 5 days after surgery, and the total daily should be divided into two or preferably three administrations. Blood transfusions correct anemia, and blood, plasma, or human albumin, given in repeated small infusions, prevents or diminishes formation of edema. Parenteral saline solution should not be used as the premature infant's kidneys can excrete only very small amounts of salt. As these infants have poor sucking action, gavage feedings of high protein or breast milk, eliminating the expenditure of extra energy, are usually employed.

Following operation, constant nursing care is essential, as complications may develop very quickly in the premature infant. Restlessness and pain may be relieved by small doses of phenobarbital, and antibiotics are given routinely to combat possible infection. Suction apparatus must be available as respiratory complications are frequent.

These principles of therapy were formulated from the authors' 16 years of experience during which 159 premature infants were treated surgically for a wide variety of malformations and conditions peculiar to early life. Of 87 who were discharged from the hospital, 10 have died subsequently, and 6 have various defects, leaving 71 living, healthy infants who survived surgery.

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### NEW ETIOLOGIC FACTOR IN ECTOPIC PREGNANCY

Although the use of antibiotics, and particularly penicillin, for infections of the female pelvic organs, has reduced the incidence of surgical treatment and consequently, the incidence of resulting sterility, it has been postulated that the drugs may also be an etiologic factor in ectopic pregnancy. Leon Krohn, M.D., and his coworkers discuss the possible relationship of penicillin therapy to an increasing number of ectopic pregnancies observed among their patients, in *The Journal of the American Medical Association*, November 29, 1952.

The authors cite their previous study in which 51 per cent of patients receiving penicillin therapy for chronic endocervicitis (the most common cause of female sterility) later became pregnant. They also observed tubal patency after treatment, in cases where the tubes had been closed previously. However, an increasing number of ectopic pregnancies among their patients also was noted, which led to the theory that improvement following penicillin therapy may result in reopening of a nonpatent tube while considerable residual damage, such as irreversible structural change in the endosalpinx, remains.

In the authors' private practice, 16 of 18 cases of ectopic pregnancies encountered during the years 1949 through 1951 had histories of previous penicillin therapy. In the same period, 994 patients were delivered. The ratio of ectopic to normal pregnancies was 1 to 55, compared to an incidence of 1 to 207, 10 years ago. The present incidence was approximately four times greater than that encountered 10 years ago, which was prior to the use of penicillin. Other institutions in various areas of the country report an approximately doubled incidence in the same period. In view of the authors' previously reported series of patients treated with penicillin for endocervicitis, and the number who later conceived, penicillin therapy appears to be a factor in the increased incidence of ectopic pregnancy.

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### A NEW AND CONSERVATIVE APPROACH TO THE MANAGEMENT OF UNCOMPLICATED SUBDELTOID BURSITIS

A simple and effective form of physical therapy for relief of subdeltoid bursitis is outlined by John F. Cullinan in the *American Practitioner*, December, 1952. The treatment, consisting of simple exercises in the quadrupedal and upright positions, was used in the successful management of 70 patients with acute and/or chronic involvement of the subdeltoid bursa. All patients were discharged symptom-free, and there has been no recurrence of symptoms.

The exercises were based on the observation that activity of the arms above the level of the shoulders helps to lessen or eliminate susceptibility to subdeltoid bursitis. Others also have observed complete absence of subdeltoid bursitis in animals where the greatest use of the arm is above shoulder level.

All patients generally exhibited the same symptoms of pain, tenderness, and limitation of motion of the arm, but two distinct symptomatic types were evident: (1) those that

exhibited digital pressure tenderness with minimal limitation of range of motion, and (2) those with spasm of the adductor-internal rotator muscle group.

In the first group, pressure tenderness was regarded as evidence of intrabursal tension which could be reduced through increased vascular activity. Exercises above the shoulder level proved ideal as the bursae were not subjected to pressure. The patient stood about 2 feet from a wall and tossed an inflated ball against it, using both arms at a point above his head. It was found that the patient in this position, with reassurance, was able to move the affected arm in a complete range of motion in all planes with little or no discomfort. Most patients received three treatments, each of about 10 minutes duration.

The second symptomatic type, suffering muscle spasm, was treated by exercises in the quadrupedal position, which relieved the spasm and re-established normal scapulohumeral rhythm. In this position, the humerus voluntarily flexed to 90 degrees, and the muscular forces acting on the shoulder united into a single force acting on the long axis of the humerus. The position provides the greatest amount of functional activity with a minimum of coincidental trauma. The three exercises used in the quadrupedal position were active flexion and extension of the humerus, active abduction of the humerus to the horizontal plane, and active abduction of the humerus in the parallel plane.

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### RESULTS OF KENNY TREATMENT OF POLIOMYELITIS

In the January 10, 1953, *Journal of the American Medical Association,* Miland E. Knapp, M.D., Lewis Sher, M.D., and Theodore S. Smith, M.D., report the results of a survey undertaken to determine the value of the Kenny treatment for acute poliomyelitis as administered under the direct supervision of Sister Kenny at the Minneapolis General Hospital between 1940 and 1945.

The Kenny treatment emphasizes (1) methods of overcoming muscle shortening or "spasm"; (2) muscle re-education stressing coordinate function rather than strength; (3) avoidance of immobilization by casts or splints, particularly during the early stages; (4) avoidance of braces or supports except where they aid function or prevent deformity.

The follow-up period ranged from 5 to 10 years during which varying therapies were administered. However, only those patients who had been admitted to Minneapolis General within 4 weeks of the onset of the disease, and during the acute stage, for which the Kenny treatment was designed, were included in the survey.

The information obtained by examination and questionnaires was classified in four groups:

Grade 1.—Completely normal patients having no residual paralysis or muscle tightness

Grade 2.—Essentially normal patients having minor weaknesses or tightnesses not severe enough to interfere with apparent normal function

Grade 3.—Moderate weakness or tightness that interferes with normal function but does not handicap severely

Grade 4.—Severe disability that definitely limits function and may require braces.

Of 478 patients treated, follow-up statistics were obtained for 391 or 81.8 per cent. Of the living patients, 69.1 per cent were essentially normal, 22.5 per cent had mild to moderate disability, and 8.3 per cent had severe disability. Later operations had been performed on 5.2 per cent and 2 per cent were found to have scoliosis. Deaths in the acute stage accounted for 7.7 per cent.

When statistics on surgical procedures were classified according to the number of weeks from the onset of poliomyelitis to beginning of the Kenny treatment, it was noted that the percentage of operations increased with the length of the interval. The same correlation between incidence and time from onset to treatment was found with the 8 patients who had residual clinical scoliosis. These observations appear to indicate the importance of early initiation of therapy.

## Book Notices

TEXTBOOK OF SURGERY. Edited by H. F. Moseley, M.A., D.M., M.Ch. (Oxon), F.A.C.S., F.R.C.S. (Eng.) F.R.C.S. (C), Assistant Professor of Surgery, McGill University; Associate Surgeon, Royal Victoria Hospital, Montreal, Canada. Cloth. Pp. 896, with illustrations and color plates. Price $15.00 The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1952.

This spick-and-span new textbook on surgery is a delight to the eye. One is impressed first by the illustrations and the excellence of their reproduction. There are 460 figures, many of which are line or halftone drawings by Helen MacArthur, of the Department of Medical Illustration of the Royal Victoria Hospital, Montreal, Canada. Done mostly in black and white but in some cases with the emphasis of fresh, clear color, these not only are good illustrations of the anatomy and technics involved but are esthetically satisfying as well. Of 46 color plates, 38, by Frank H. Netter, are from the Ciba Collection of Medical Illustrations. These combine color drawings of surgical and pathologic anatomy with x-rays and color reproductions of photomicrographs in such a way as to make them excellent teaching pictures. There are three photographs in color of cancer of the tongue and lip from monographs by Hayes Martin and five of tumors of the genitourinary system from a monograph by Victor F. Marshall.

In such a well and profusely illustrated book, the emphasis is on visual education. This, of course, is in line with modern educational principles. With so much visual aid it has been possible to keep textual descriptions brief. The authors of the various chapters are all members of the Surgical Department of the Royal Victoria Hospital and of the Departments of Neurosurgery, Obstetrics and Gynecology, and Pathology, all associated with McGill University. They have done a fine job in creating a well-written, concise, up-to-the-minute text designed to contain "the amount of factual information required by students at the time of their graduation and during their early period as interns."

The text is well organized and the headings carefully planned to show the arrangement of the material and to catch the eye of the reader searching for particular topics. Material on the eye, ear, nose, and throat and on gynecology as a specialty is not included, nor are there special sections on anatomy, physiology, and pathology. Material in the latter three fields considered necessary to a general textbook on surgery is incorporated in the chapters on specific parts of the body.

The large pages contain two columns of reading matter. The type is large and clear and the paper of high quality. There is a full index.

This new textbook is a real contribution to the field. It should prove not only an excellent textbook but a good reference work for the surgeon and the general practitioner.

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PRACTICAL DERMATOLOGY. For Medical Students and General Practitioners. By George M. Lewis, M.D., F.A.C.P., Professor of Clinical Medicine (Dermatology), Cornell University Medical College; Attending Dermatologist, The New York Hospital; Secretary, the American Board of Dermatology and Syphilology. Cloth. Pp. 328, with illustrations. Price $7.50. W. B. Saunders Company, West Washington Sq., Philadelphia, 1952.

Reading this book leaves one with the feeling of having sat through a series of lectures dressed up a bit and with a few extras included. The book is a series of relatively brief factual dissertations, with no suggestion as to conflicting

*(Continued on page 411.)*